

A Hayden Publication

May 1983

\$3.00

PERSONAL COMPUTING

Buyer's
Guide To
PORTABLE COMPUTERS

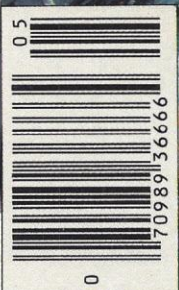
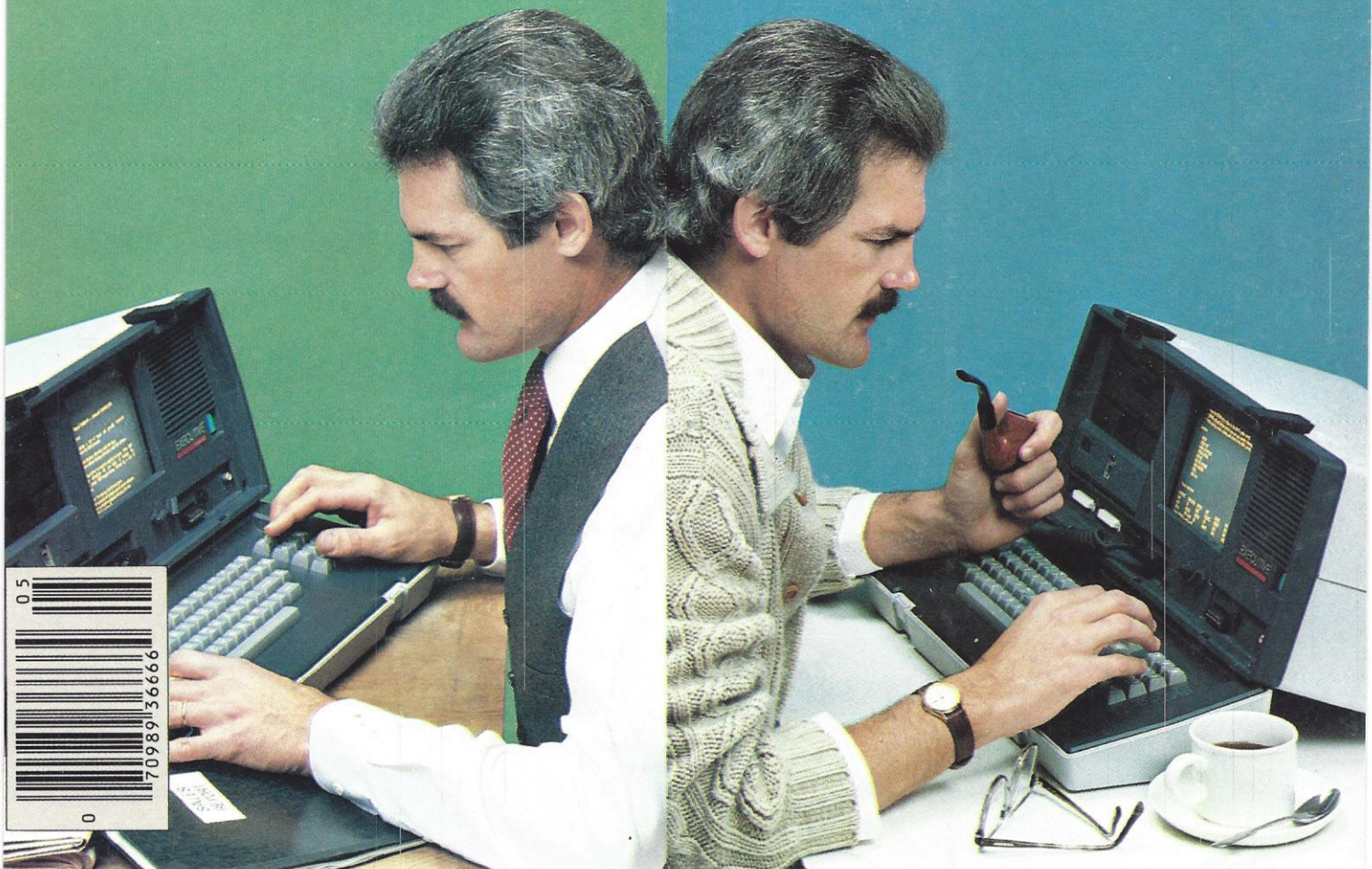
Canada &
International
\$3.50

The Benefits Of Computer Portability

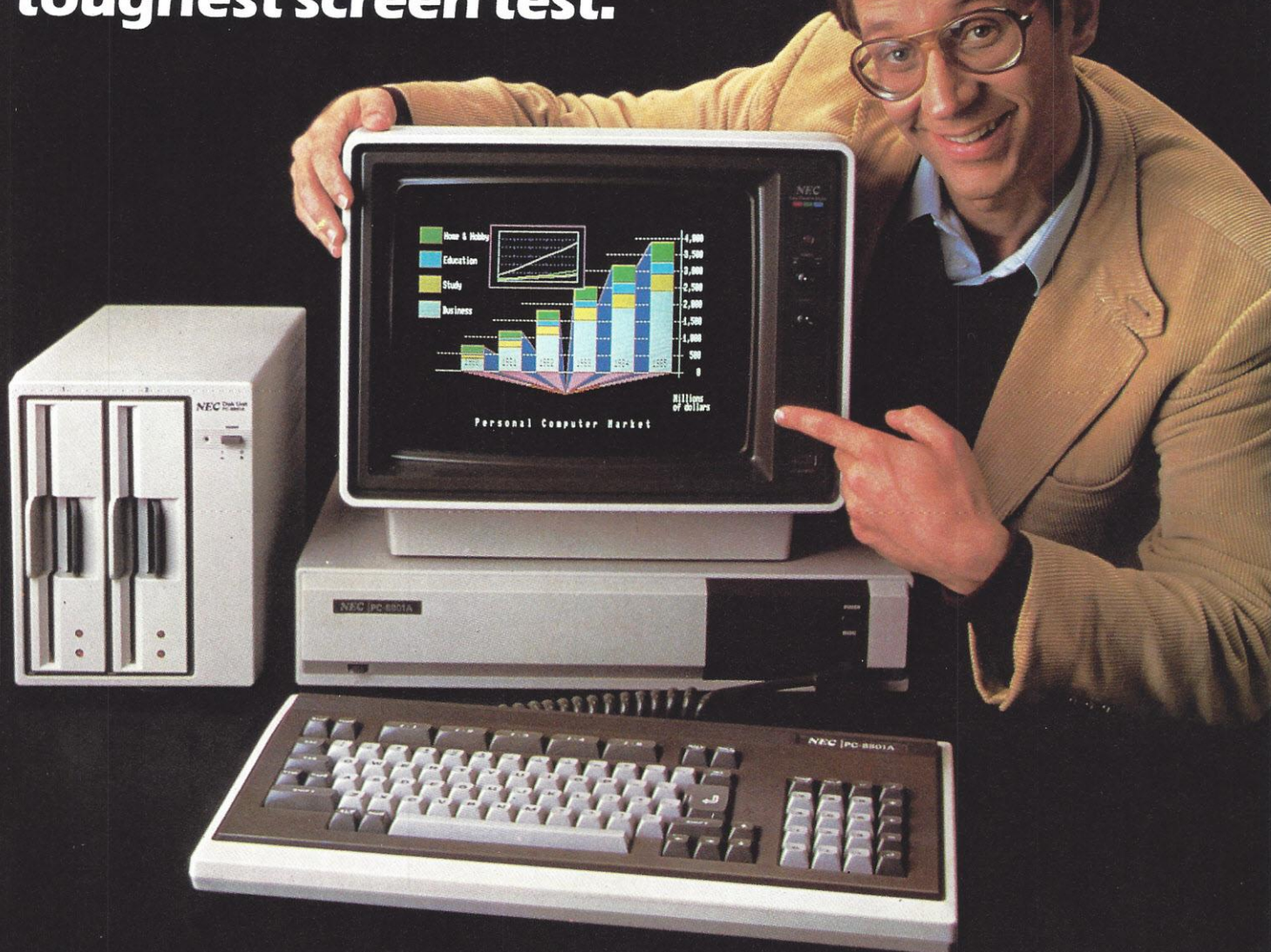
How To Stretch Your Software

Using Data Banks As A Business Tool

The Fourth R: Computer Literacy



NEC passes your toughest screen test.



If you're getting into "pictures," you can't do better than NEC's new PC-8800 personal computer system. It gives you the highest resolution (640 x 400) of any standard system you can buy.

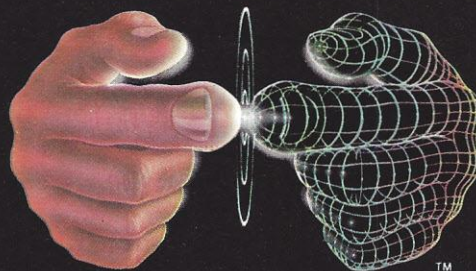
And no other system can give you the PC-8800's high-powered graphics hardware. With R/G/B output and more than 60 distinct colors, it's the perfect system for people who like to paint by numbers.

But it's more than just a pretty face. The PC-8800 is powerful, too, with 8-bit and optional 16-bit capability and up to 256K of RAM. It offers parallel and serial interface, and gives you both color and monochrome capability standard. Either 5¼" or 8" disk drives can be used.

The modular design is attractive and convenient, making the PC-8800 pleasing to your eye in more ways than one.

And a whole range of software is available for the CPM™-based* PC-8800.** You can use it when you're getting down to business or just having fun.

The PC-8800 computer system. Audition it at your local NEC Home Electronics dealer.



Productivity at your fingertips

NEC

**NEC Home Electronics (U.S.A.), Inc.
Personal Computer Division**

1401 Estes Avenue,
Elk Grove Village, IL 60007

Nippon Electric Co., Ltd., Tokyo, Japan

*TM Digital Research

**MS-DOS (TM Microsoft) and CPM-86 operating systems will also be available soon.

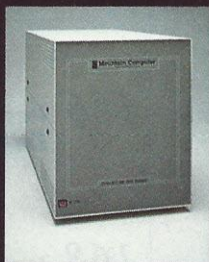
**NOW \$1,995.
HARD DISK SYSTEM**

HOW TO GIVE YOUR PERSONAL COMPUTER A MEMORY THE SIZE OF A MOUNTAIN.

Now you can have up to 70 times more memory than any floppy disk gives you. And up to 50% more than any other hard disk.

The new Dynamic Disk System from Mountain Computer comes in 5, 10 or 15 megabyte sizes, using proven Seagate 5 1/4" Winchester technology and Mountain's reputation for quality products.

If you need the size, speed and reliability of a hard disk,



Mountain has the disk for you. Floppies just don't have the capacity for those big computing jobs. And other hard disks don't have the usable storage space of Mountain's.

Why? Because Mountain's Dynamic Volume Allocation protects you from wasting expensive space. Disk space is reserved only when data is actually written, a unique feature found on no other disk system. The result? You can change parameters at any time you wish to meet the

realities of your computing job.

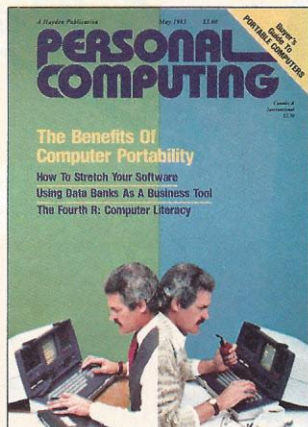
Give your Apple II, Apple III or IBM personal computer the biggest and the best. Take home the only memory system that's big enough to be called a mountain.

See your nearest Mountain dealer today or send us your business card for further information. Mountain Computer Inc., 300 El Pueblo Road, Scotts Valley, CA 95066, Tel. (408) 438-6650.



MOUNTAIN COMPUTER
Incorporated

FEATURES



With a portable computer, the business executive can leave his office carrying nothing bulkier than a medium-size suitcase and arrive at his destination armed with the power and leverage of a sophisticated personal computer.
Page 87

COVER PHOTOGRAPHY
GEORGE B. FRY III

PROFESSIONAL/MANAGERIAL

When Congress Asks To See The Bill

The Congressional Budget Office is using personal computers to make sure its forecasts are right on the money.

56

EDUCATION

Computer Literacy: The Fourth "R"

"Blessed are the young, for they shall inherit the future." You can help your children prepare for their future with personal computing.

63

PROFESSIONAL/MANAGERIAL

The Well-Traveled Computer

To have a full-scale computer system as a traveling companion requires a strong dose of ingenuity. But the rewards are worth the effort.

72

ADVANCED

Stretching Your Software

There may be more potential in your software than the package proclaims.

80

BUSINESS

Portable Power

For the traveling businessman portable computers are the way to go.

87

DEPARTMENTS

567,189 COPIES
OF THIS ISSUE
PRINTED

FOR SUBSCRIBER CHANGE OF ADDRESS: Fill out coupon in this issue. Attach old mailing label, or write in your subscriber ID# which appears above your name. Fill new address information and send to Personal Computing, P.O. Box 2942, Boulder, CO 80322. Allow 6-8 weeks for address change to become effective. BACK ISSUES OF PERSONAL COMPUTING are available on microfilm, microfiche, 16mm or 35mm roll film. They can be ordered from Order Dept., University Microfilms International, 300 North Zeeb Rd., Ann Arbor, MI 48106. HAYDEN PUBLISHING CO., INC., James S. Mulholland, Jr., President; Barbara Freundlich, Circulation Director; PUBLISHER: Electronic Design; Computer Decisions; MicroWaves; Personal Computing; Electronic Design's Gold Book; MicroWaves' Product Data Directory; Hayden Books; Hayden Software.

5 From The Editor

Where is personal computing going from here? The answer is everywhere. In fact, the era of personal computing power has just begun

23 Answers

Will easy computing make programming languages obsolete?

35 People In Computing

Fire-fighting system saves valuable timberland; giving business growth a computerized push

131 Law

Copying computer software—risks and penalties

139 Book Reviews

156 Personal Computing Dealers

168 Hardware Of The Month

Radio Shack and Osborne introduce their new portable personal computers

SPECIAL REPORT

How To Pick A Portable Computer

A buyer's guide to features and capabilities of portable and hand-held computers.

96

BUSINESS

Getting The Best From Data Banks

Data-base retrieval systems can be a valuable tool for any growing business.

111

EDUCATION

Taking A Stand For Computers In Education

How one teacher turned computer learning into a class act.

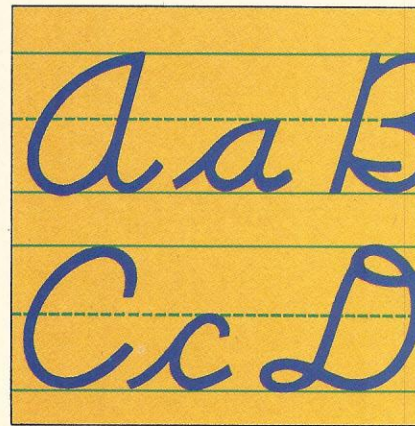
121

ESSAY

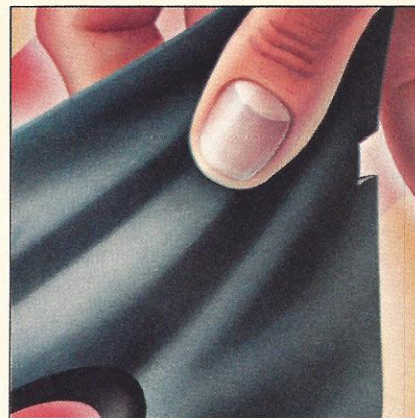
The Future Of Computing: Personal With A Capital P

Computers won't take us through the frontier of the future. Computing will. It's not the machine, but the minds behind them that make the difference.

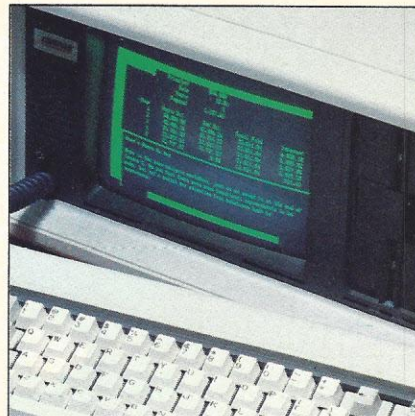
211



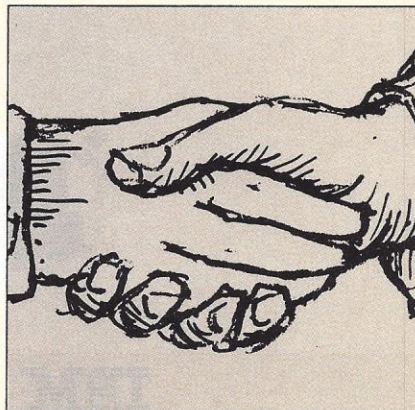
PAGE 63



PAGE 80



PAGE 87



PAGE 211

- 182 Software Of The Month**
Hewlett Packard enhances the HP-86/87 with word-processing and file management packages

- 192 Advertisers' Index**

- 195 Letters**
Readers comment on common software assumptions, graphics for CP/M, and getting computers into the classroom

- 201 Interview**
Adam Osborne, chairman of the board of Osborne Computer Corporation, talks about the future of the industry

Keyboard instruction
 Learning DP
 Maintaining school files
 School administration
 Metric conversion lessons
 Learning computers
 Drawing a face
 Learning FORTRAN
 Interactive training
 Educational games
 Lease classification
 Property management
 Engineering circuitry
 Fuel oil tracking
 Medical accounting
 Cataloging librarian
 Dental invoice generator
 Income tax preparation
 Data base for insurance
 Apartment building system
 Athletic statistics
 Structural engineering
 Medical office system
 Medical diagnostic analysis
 Travel agency tracking
 Trucking system
 Church management
 Forms designer
 Fixed asset manager
 Mortgage tracking
 Amortization system
 Games for executives
 Automated recipe file
 Personal tax planning
 Home finance
 Writing CAI courses
 Administrative reports
 Geometric graphics
 Color graphics
 Address file updating
 Spelling checker
 Name directory
 Order entry
 Utility billing
 Retail management
 Project costing
 Mail list management
 Money market management
 Investment analysis
 Playing blackjack
 Electronic mail
 Activity organizer
 Survey analysts
 Electronic spreadsheet
 Statistical study/cross tabulation
 Project tracking
 Business marketing
 Hypothesis testing
 Quantitative decision making
 Time billing
 Filing system
 Inventory control
 Scheduling/organizing
 Cash flow analysis
 Database sort/index
 General ledger
 Tax planner
 Household inventory
 Learning Pascal
 Fantasy games
 Payroll
 Project planning
 General accounting
 Accounts payable
 Accounts receivable
 Job costing
 Word processing
 Business graphics
 Arithmetic drill
 Touch typing lesson
 BASIC programming
 Financial analysis
 Spreadsheet program

IBM®

CIRCLE 3

How many pieces of software can
 you use on the IBM Personal Computer?
 1,000 and up.

EDITOR
Paul Kellam

MANAGING EDITOR
Ernest Baxter

SENIOR EDITORS
David Gabel
Michael Rogers

ASSOCIATE EDITORS
Trudy E. Bell
Jeffrey Rothfeder
Lee Thé

ASSISTANT MANAGING EDITOR
Cecilia Wessner

ASSISTANT EDITORS
Elli Holman
John F. King

EDITORIAL RESEARCHER
Bette Schwartzberg

COPY EDITOR
Nora Georgas

EDITORIAL ADMINISTRATOR
Joan Wright

EDITORIAL ASSISTANT
Joy Carlish

ASSOCIATE PUBLISHER
C. Patrick Raleigh

DESIGN & ART CONSULTANT
Robert G. Bryant

PRODUCTION MANAGER
Vince Cicenía

BUSINESS MANAGER
Greg Miller

CIRCULATION CONSULTANTS
John D. Klingel
George Carleton & Assoc.

CIRCULATION
Robert Paratore
James Moorehead
Merri Hollander
Phyllis Petrie

VICE PRESIDENT AND PUBLISHER
Robert J. Lydon

Where Is Computing Going?

We get a lot of questions here at *Personal Computing*, and perhaps the most frequent one—in one form or another—is represented in the title above.

Just where is personal computing going? The answer, if one thinks in terms of mobility, seems to be “everywhere.” Charles Rubin, who wrote our cover story, “Portable Power,” beginning on page 87, tells of a consultant who takes the computer to the client, a manufacturer’s representative who takes her computer with her on the road, a marketer who carries his back and forth between home, office, and client presentations, a foreign correspondent who lugs his all over the world, and a lawyer who takes his to court.

To keep the context under control, by the way, we’re defining portable computers here as programmable systems capable of full computing functions, capable of utilizing peripherals, and small enough to be closed up in one package and placed under an airplane seat.

There are two keys to portability—size (smaller) and power (greater). Manufacturers are packing more power into less space than ever before. Senior Editor David Gabel and Editorial Researcher Bette Schwartzberg have focused on the current state of the portable art in “Buyer’s Guide to Portable and Hand-Held Computers,” beginning on page 96. One might look at the trend toward big power in small packages and conclude that movement will continue in both directions.

It may not be quite that simple, however, as Senior Editor Michael Rogers learned when he visited Adam Osborne, Chairman of The Osborne Computer Corporation and father of the first portable computer, the Osborne.

In his interview, beginning on page 201, Rogers found Osborne adding other dimensions to the larger and smaller directions in which computing is moving.

Osborne sees trends towards specialization, particularly in the home. He also sees risks to society through personal computing—particularly as individuals are able to access and manipulate mainframe data bases of large institutions such as banks.

As for us, we think the strength of computing in the future lies in the incredible undeveloped capacity of the personal computer to lever the power of individual human minds. Tapping this power for good, we believe, requires greater understanding of the distinctions between personal use and institutional use—a thought developed in “The Future of Computing: Personal With a Capital P,” beginning on page 211.

So, where is computing going? That’s hard to say with any precision; there are so many aspects, so many ways of looking at it. The era of personal-computing power has barely begun. No one knows exactly where it will lead. But we’re optimistic by nature and therefore convinced that as individual human minds get cracking at the problems that beset us those problems will be solved.

Paul Kellam

PERSONAL COMPUTING (ISSN 0192-5490) is published monthly by Hayden Publishing Company, Inc., 50 Essex St., Rochelle Park, NJ 07662. Printed at World Color Press, Inc., Mt. Vernon, IL. Second class postage paid at Saddle Brook, NJ and at additional mailing offices. Copyright© 1983, Hayden Publishing Company, Inc. All rights reserved. POSTMASTER: Please send form 3579 to PERSONAL COMPUTING, P.O. Box 2942, Boulder, CO 80322. Subscription rates: U.S. 1 year (12 issues) \$18; 2 years (24 issues) \$33; 3 years (36 issues) \$46. Canada & Mexico: add \$4/year for surface mail, \$8/year for airmail. Other countries: add \$8/year for surface mail, \$36/year for airmail. Back issues: U.S.: \$4. All other countries: \$5. Audited Paid Circulation.



Inside Apple

Apple Computer Inc., 20525 Mariani Avenue, Cupertino, California 95014

Vol. 1 No. 2

For the authorized Apple dealer nearest you, call 800-538-9696 (800-662-9238 in California.)

Fruitful Connections.

There are more people in more places making more accessories and peripherals for Apples than for any other personal computer in the world.

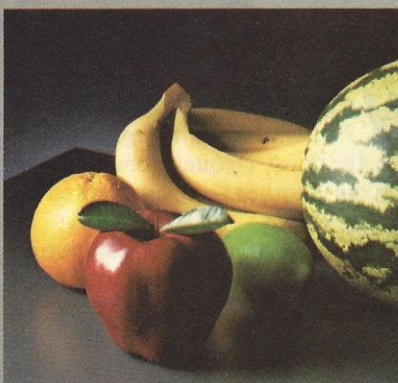
Thanks to those people — in hundreds of independent companies — you can make the humblest 1978 Apple II turn tricks that are still on IBM's Wish List for 1984.

But now we're coming out with our very own line of peripherals and accessories for Apple® Personal Computers.

For two very good reasons.

First, compatibility. We've created a totally kluge-free family of products designed to take full advantage of all the advantages built into every Apple.

Second, service and support.



Now the same kindly dealer who keeps your Apple PC in the pink can do the same competent job for your Apple hard-disk and your Apple daisywheel printer.

So if you're looking to expand the capabilities of your Apple II or III, remember:

Now you can add Apples to Apples.

A joy to behold.

The new Apple Joystick II is the ultimate hand control device for the Apple II.

Why is it such a joy to use?

With two firing buttons, it's the first ambidextrous joystick — just as comfortable for lefties as righties.

Of course, it gives you 360° cursor control (not just 8-way like some game-oriented devices) and full X/Y coordinate control.

And the Joystick II contains high-quality components and switches tested to over 1,000,000 life cycles.

Which makes it a thing of beauty. And a joystick forever.



Gutenberg would be proud.

Old Faithful Silentype® has now been joined by New Faithfuls, the Apple Dot Matrix Printer and the Apple Letter Quality Printer.

So now, whatever your budget and your needs, you can hook your Apple to a printer that's specifically designed to take advantage of all the features built into your Apple. With no compromises.

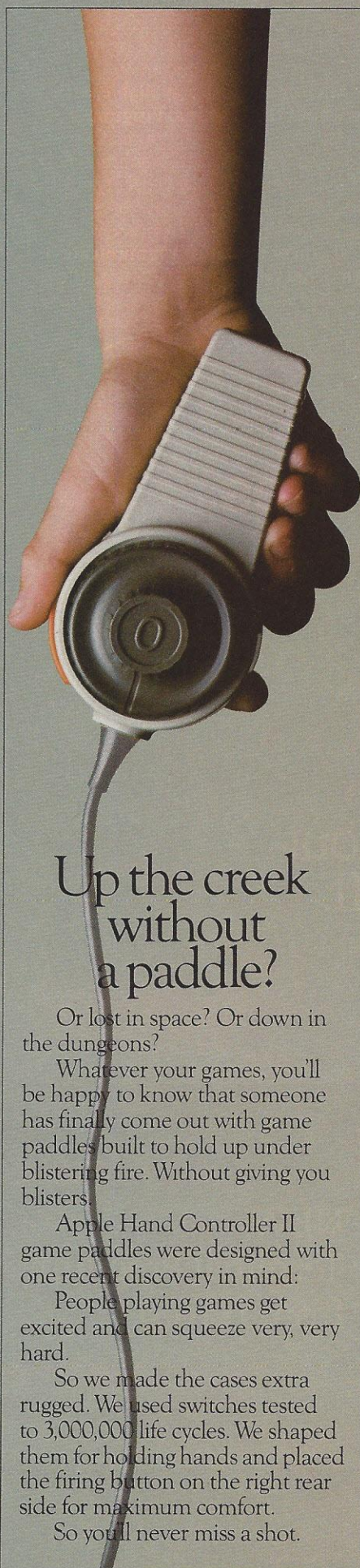
The 7x9 Apple Dot Matrix Printer is redefining "correspondence quality" with exceptional legibility.

With 144x160 dots per square inch, it can also create high resolution graphics.

The Apple Letter Quality Printer, which gets the words out about 33% faster than other daisywheel printers in its price range, also offers graphics capabilities. See your authorized

Apple dealer for more information and demonstrations. Because, unfortunately, all the news fit to print simply doesn't fit.





Up the creek without a paddle?

Or lost in space? Or down in the dungeons?

Whatever your games, you'll be happy to know that someone has finally come out with game paddles built to hold up under blistering fire. Without giving you blisters.

Apple Hand Controller II game paddles were designed with one recent discovery in mind:

People playing games get excited and can squeeze very, very hard.

So we made the cases extra rugged. We used switches tested to 3,000,000 life cycles. We shaped them for holding hands and placed the firing button on the right rear side for maximum comfort.

So you'll never miss a shot.

A storehouse of knowledge.

If you work with so much data or so many programs that you find yourself shuffling diskettes constantly, you should take a look at Apple's ProFile™, the personal mass storage system for the Apple III Personal Computer.

This Winchester-based 5-megabyte hard disk can handle as much data as 35 floppies. Even more important for some, it can access that data about 10-times faster than a standard floppy drive.

So now your Apple III can handle jobs once reserved for computers costing thousands more.

As for quality

and reliability, you need only store one word of wisdom:

Apple.



Launching pad for numeric data.

Good tidings for crunchers of numerous numbers:

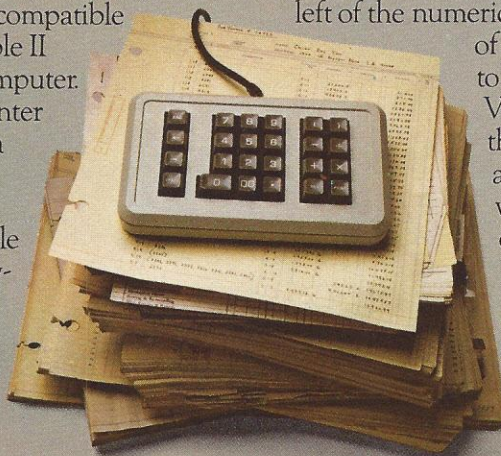
Apple now offers a numeric keypad that's electronically and aesthetically compatible with the Apple II Personal Computer. So you can enter numeric data faster than ever before.

The Apple Numeric Keypad II has a standard calculator-style layout. Appropriate,

because unlike some other keypads, it can actually function as a calculator.

The four function keys to the left of the numeric pad should be of special interest to people who use VisiCalc®. Because they let you zip around your work sheet more easily than ever, adding and deleting entries.

With one hand tied behind your back.



More Apple II owners choose Hayes Micromodem II than any other modem in the world. Compare these features before you buy. You should. It's your money. Thousands of other Apple II owners have already compared, considered, and are now communicating — all over the U.S.A. — with Micromodem II. The best modem for the Apple II. The most modem for your money.

A complete data communication system. Micromodem II is not "base priced" plus necessary "options." It's a complete, high-performance data communication system. The printed circuit board fits — quickly and easily — into your Apple II, eliminating the need for a serial interface card. And the Microcoupler™ (included) connects the Apple II directly to a standard modular telephone jack. Auto-dial and -answer features are built in. Operation can be full or half duplex,

with a transmission rate of 300 bps. And it's Bell 103 compatible and FCC approved.

Now there's Hayes Terminal Program, too! Developed by Hayes specifically for Micromodem II, this new

Terminal Program allows you to access all the great features of your modem in a matter of seconds.

With it, you can use your CP/M®, DOS

3.3 or Pascal formatted disks to create, send, receive, list and delete files. Hayes Terminal Program is a complete, stand-alone disk.

And because it's menu driven, you can choose from a wide variety of options to set your communication parameters — as well as change hardware configuration — directly from the keyboard. It even allows you to generate ASCII characters that are normally not available from Apple

keyboards, further extending your capabilities. Incoming data can be printed (on serial or parallel printers) as it's displayed on your screen.

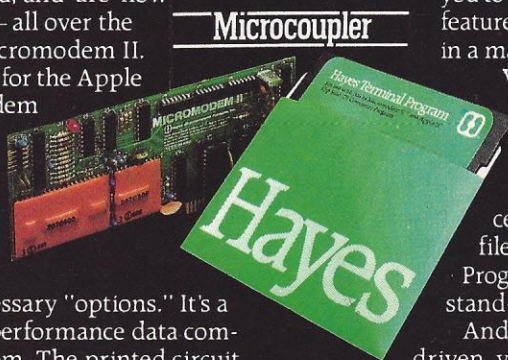
Micromodem II is available with or without the Terminal Program. Buy your modem by itself, or optionally packaged with the Terminal Program disk and user manual at extra cost. The software is also sold separately, for those who already own a Micromodem II.

If you're ready to communicate with other computers, to access information utilities, time-sharing systems, or use bulletin boards, then you're ready for Micromodem II. Come on. Compare. Consider. Then buy.

Micromodem II is already the best-selling modem for the Apple II. And Hayes' new Terminal Program

makes it better than ever. Available at computer stores nationwide.

Hayes Microcomputer Products, Inc.
5835 Peachtree Corners East
Norcross, Georgia 30092 (404) 449-8791



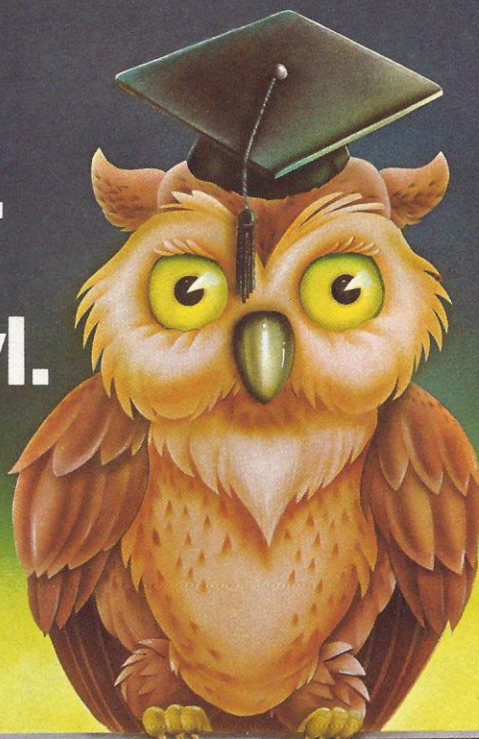
Hayes

**Your Apple® II
just isn't the same without
Hayes Micromodem II.™**

NEW!
**Terminal Program
from Hayes!**

™Micromodem II and Microcoupler are trademarks of Hayes Microcomputer Products, Inc. Apple is a registered trademark of Apple Computer, Inc. CP/M is a registered trademark of Digital Research, Inc. © 1982 Hayes Microcomputer Products, Inc. Sold only in the U.S.A.

**Be Wise.
Be Thrifty.
Be A
Night Owl.**



Your Own University Library Online At Home!

If you're free between the hours of six and midnight, make a date with one of the world's fastest, most powerful online information services — at a fraction of what it would cost during the business day. All you pay is a \$50 registration fee to receive your classified user's password. Then, any evening, you can summon up a wealth of information for as little as \$6 per hour.

Technical and scientific abstracts. Medical journals. Government studies. Business indexes. Major newspapers. BRS/AFTER DARK gives you access to the same comprehensive data files used by BRS Search Service subscribers, which include major corporations and reference libraries throughout the world. All instantly accessible with simple, interactive language.

Of course, BRS/AFTER DARK also gives you valuable peripheral services like a home-computer Newsletter and nationwide communication via electronic mail. Plus, shop-at-home services and instant software delivery programmed for the very near future.

Don't let another evening go by without BRS/AFTER DARK. All you need is your phone and any dial-up system or terminal. For more information about BRS/AFTER DARK, just fill out the coupon.

CIRCLE 5

BRS



AFTER DARK

Sign me up as a BRS/AFTER DARK subscriber for a one-time subscription fee of \$50. (Basic user's rate as low as \$6 hour.)

PE 5/83

☐ Charge to MASTER CARD/VISA (circle one)

Acct. No. _____ Expires _____

☐ Send more information

Signature _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Mail to: BRS • 1200 RT. 7 • LATHAM, NY 12110 • (518) 783-1161



LAST NIGHT, COMPU SERVE TURNED THIS COMPUTER INTO A TRAVEL AGENT FOR JENNIE, A STOCK ANALYST FOR RALPH, AND NOW, IT'S SENDING HERBIE TO ANOTHER GALAXY.

NO MATTER WHICH COMPUTER YOU OWN, WE'LL HELP YOU GET THE MOST OUT OF IT.

If you've got places to go, CompuServe can save you time and money getting there. Just access the Official Airline Guide Electronic Edition—for current flight schedules and fares. Make reservations through our on-line travel service. Even charter a yacht through "Worldwide Exchange."

If your money's in the market, CompuServe offers a wealth of

prestigious financial data bases. Access Value Line, or Standard and Poor's. Get the latest information on 40,000 stocks, bonds or commodities. Then, consult experts like IDS or Heinold Commodities. All on line with CompuServe.

Or if, like Herbie, intergalactic gamesmanship is your thing, enjoy the best in fantasy, adventure, and space games. Like MegaWars, the ultimate computer conflict.

To get all this and more, you'll

need a computer, a modem and CompuServe. CompuServe connects with almost any personal computer, terminal, or communicating word processor. To receive an illustrated guide to CompuServe and learn how you can subscribe, contact or call:

CompuServe

Consumer Information Service
2180 Wilson Road, Columbus, Ohio 43228

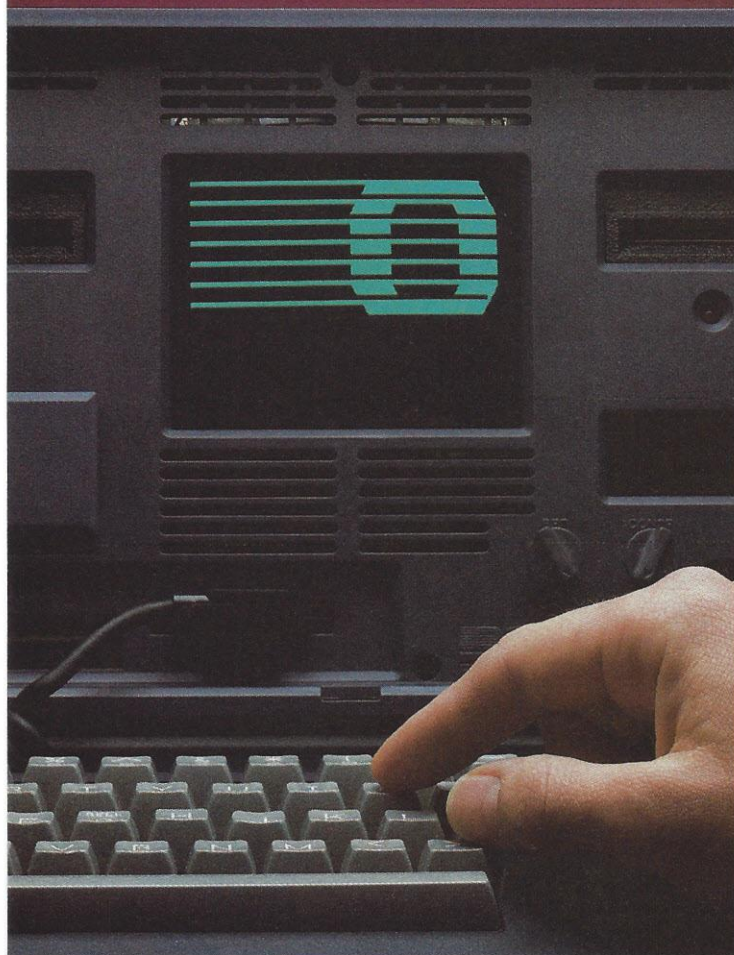
800-848-8199

In Ohio, call 614-457-8650

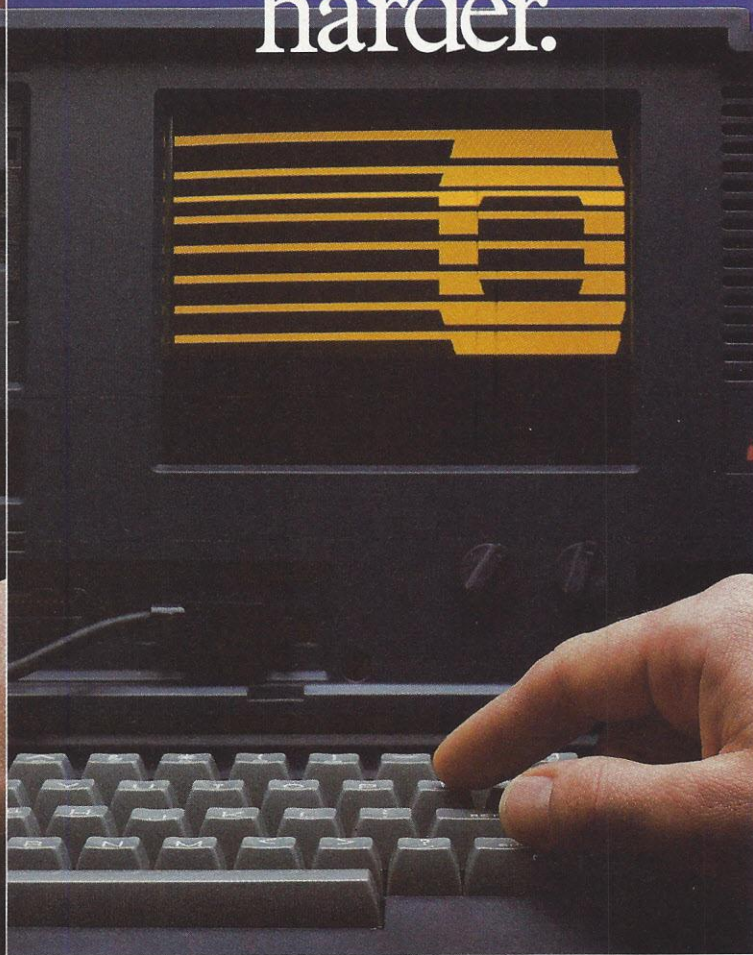
An H&R Block Company

CIRCLE 35

We listened.



We listened harder.



Introducing the new Osborne™ Executive™ Series.

We listened when you told us you wanted a personal business computer.

We delivered the Osborne 1.

And in the two years since its introduction, the Osborne 1 has become the largest selling portable business computer on earth.

We listened harder.

The result is the new Osborne Executive Series. Consider these new advantages:

- A big, 80-column, eye-easy amber display lets you see more of the information you're using, with less effort.
- Memory is expanded, for larger spreadsheets.
- The new Executive Series now includes a database system—Personal Pearl!™ (That's in addition to an already formidable list of standard Osborne software, including word processing and electronic spreadsheets.)
- Terminal

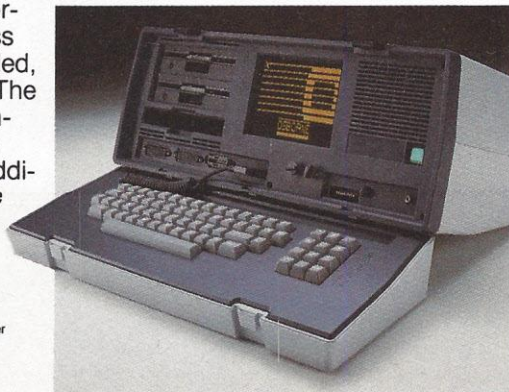
Emulation provides access to information stored on other computers. □ IBM Personal Computer™ compatibility (on the Executive 2) lets you use software packages designed for the IBM system.

And there's much more.

Add up the value of all the hardware features and software systems included with either the Executive or Executive 2 and you will see that the sticker price is one of the incredible bargains available in personal computing.

Visit your local authorized Osborne dealer. Once again, Osborne has set the standard for portable business computers.

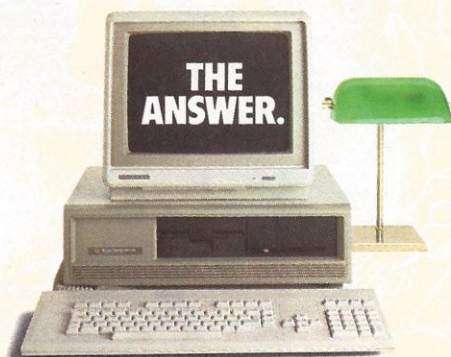
For the name of your nearest Osborne dealer, dial (800) 772-3545 ext. 905 (in California); (800) 227-1617 ext. 905 (outside California).

Trademarks: Osborne 1, Executive, Executive 2: Osborne Computer Corporation. Personal Pearl: Relational Software. IBM Personal Computer: International Business Machines.

OSBORNE
COMPUTER CORPORATION
CIRCLE 6



The new TI Professional Computer. It makes you the one with the answers.



Today's business executive is faced with a world of questions. Questions about productivity. Cost control. And the bottom line.

To help you come up with the answers and alternatives, we introduce the new Texas Instruments Professional Computer. The one with the power, the expandability, the easiest-to-use keyboard, extremely high resolution graphics, and a broad array of software.

SPECIFICATIONS

System Unit

16-bit, 8088 microprocessor
64K byte RAM, expandable to 256K bytes
4K byte graphics display memory
5-slot expansion bus

Keyboard

Specially designed low profile
Popular typewriter layout
97 keys, including 12 function keys
Separate numeric keypad and cursor control clusters
Tactile response, for quick positive entry
Upper- and lower-case letters

Display Units

12-inch monochrome (green phosphor) or
13-inch full-color, 25 lines x 80 columns
High resolution, 720 x 300 pixels

Mass Storage

Built-in 320K byte diskette standard
Additional internal storage of 320K byte diskette, or 5 or 10 Mbyte Winchester disks optional

Communications Options

300 BPS or 300/1200 BPS internal modem
TTY, 3780
3270 SNA stand-alone (Summer 1983)
3270 BSC and SNA cluster (Fall 1983)

Operating Systems

MS™-DOS, Digital Research™ CP/M-86®, and
Concurrent CP/M-86™, UCSD p-System™

Languages

BASIC, COBOL, FORTRAN, Pascal

Applications Software

Over 100 programs available from the most popular software vendors such as Microsoft, Ashton-Tate, Micro-Pro, IUS, Sorcim, Peachtree, BPI, Lifeboat and others.

Printers (Available Spring 1983)

150-cps TI 850 Series for most applications

FOOTNOTES: MS-DOS is a trademark of Microsoft Corporation. CP/M-86 and Concurrent CP/M-86 are trademarks of Digital Research, Inc. UCSD p-System is a trademark of the Regents of the University of California.

All the leading operating systems and programming languages are available. You can use many popular application programs from the best software suppliers to help you create spreadsheets, do word processing, construct graphics, communicate with other data bases or create your own. All of which lets you control assets, manage your time, and make projections for tomorrow's performance — today.

And for a clear "hard copy" print-out of information, you can rely on the new 850 Series printers, made by Texas Instruments especially for the new TI Professional Computer.

In short, the TI Professional Computer helps you make better business decisions based on better information. With the performance and reliability you expect from TI.

If you're on your way up, the new Texas Instruments Professional Computer can help. Because it makes you the one with the answers.

For information and a demonstration, visit your local computer dealer, or write: Texas Instruments, Data Systems Group CA, Dept. 21APC, P. O. Box 402430, Dallas, TX 75240. Or call toll-free: 1-800-527-3500.

Creating useful products
and services for you.



TEXAS INSTRUMENTS

HOW TO GET MORE DONE BY TYING UP YOUR PERSONAL COMPUTERS.

Now SAVE A BUNDLE
OMNINET™ Hardware and Software
Ask your dealer for details

Now you can tie your personal computers together—and be more productive— with Corvus OMNINET.™

An OMNINET local area network connects over 60 personal computers, so you can share common equipment—even different computer brands.* More importantly, you can *share the costs* of high-performance peripherals, such as printers and Corvus hard disks storing up to 80 million characters.

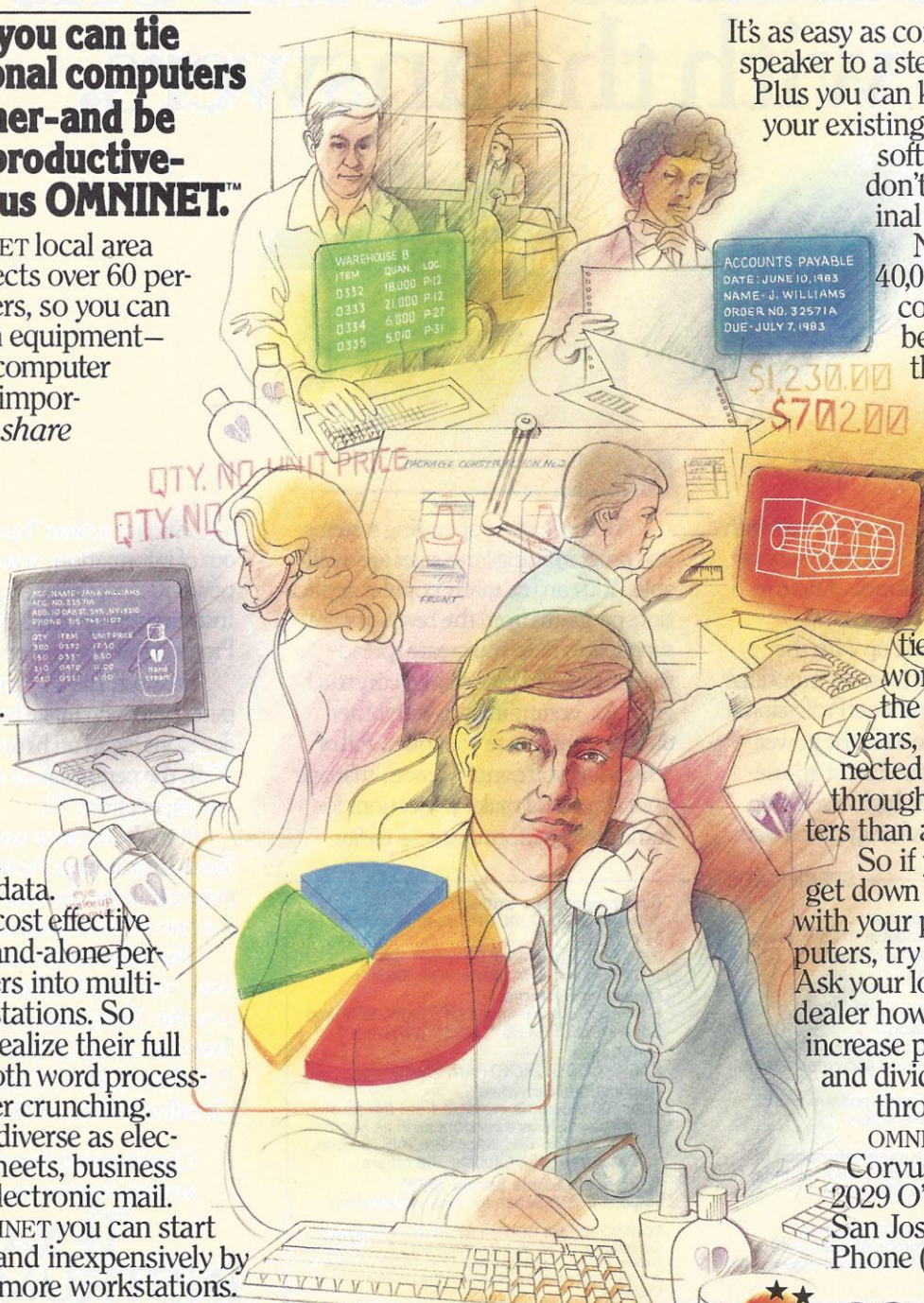
OMNINET also improves productivity by letting you share common programs and data. That makes it cost effective to turn your stand-alone personal computers into multi-purpose workstations. So now they can realize their full potential for both word processing and number crunching. And things as diverse as electronic spreadsheets, business graphics and electronic mail.

With OMNINET you can start small, and expand inexpensively by simply adding more workstations.

It's as easy as connecting a speaker to a stereo system. Plus you can keep on using your existing hardware and software, so you don't lose your original investment.

No wonder over 40,000 personal computers have been connected through Corvus networks in Fortune 1000 companies, small businesses, professional offices and educational facilities around the world. In fact, over the past three years, we've connected more people through microcomputers than anyone else.

So if you're ready to get down to business with your personal computers, try tying them up. Ask your local computer dealer how you can increase productivity—and divide your costs—through Corvus OMNINET. Or contact Corvus Systems, 2029 O'Toole Ave., San Jose, CA 95131. Phone (408) 946-7700.



*OMNINET currently ties together Apple II, Apple II CP/M, Apple III, IBM PC, and the Corvus Concept,™ and soon the NEC PC8001, DEC VT180, Zenith Z89/90 and Z100, S-100 bus computers, and TI Professional Computer.

Apple, IBM, and CP/M are trademarks, respectively, of Apple Computer, Inc., International Business Machines Corporation and Digital Research, Inc. Corvus OMNINET, Corvus and Corvus Systems are all trademarks of Corvus Systems, Inc.

**CORVUS
SYSTEMS**

Tying it all together.

More than a personal computer.



It's an accountant, word processor and financial planner. Now for only \$3,390 per user.*

No matter what business or profession you're in, ALTOS® has a desktop business computer system that can improve your efficiency—at a price that won't put you out of business.

For example, a typical Altos business solution includes integrated software applications for accounting (including a self-paced, step-by-step, built-in tutorial), word processing and financial planning. They're all easy to learn and use.

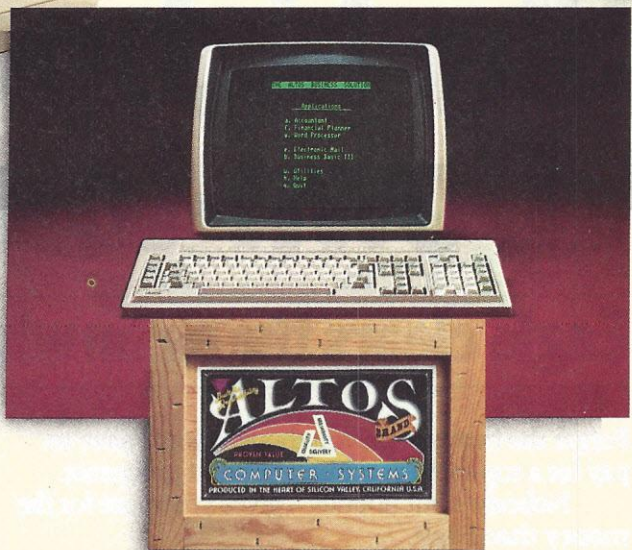
You can also choose from hundreds of other applications for attorneys, dentists, doctors, insurance agents, manufacturers, pharmacists, realtors and many more.

Altos systems are designed to grow as your business grows. You can start with a single user and add more users on the same system. Plus you can link hundreds together with a network.

And when you're ready, built-in features let you add more storage capacity, peripherals and communications—even electronic mail and appointment scheduling.

All of our systems are backed by responsive, nationwide service and support through the Customer Service Division of TRW, Inc.

So if your business or profession demands more than a personal computer can deliver, talk to Altos. Call, write or clip the coupon today for a free brochure and the name of your local Altos representative.



Packed with more value for business

☐ Please tell me more about the hundreds of uses for an Altos desktop business computer system.

☐ My application is _____.

☐ Please have an Altos representative contact me.

Name _____ Title _____

Company _____ Tel _____

Address _____

City/State/Zip _____

Mail to: Altos Computer Systems, Attn: Marketing Services,
2641 Orchard Park Way, San Jose, CA 95134

PC-483

800-538-7872 (In Calif., 800-662-6265)

*Complete five user Altos system for \$3,390 per user or \$16,950. Price approximate and may vary in your area. Packaged system includes an Altos 586-10 hard disk computer with the XENIX™/UNIX™ operating system with the Altos "Business Command Menu Interface," five terminals, and the ALTOS ACCOUNTANT (with the built-in ALTOS COMPUTER TUTOR), ALTOS EXECUTIVE WORD PROCESSOR, and ALTOS EXECUTIVE FINANCIAL PLANNER applications. Price does not include printer, cables, installation, taxes, additional training and maintenance.

ALTOS is a registered trademark of Altos Computer Systems. XENIX is a trademark of Microsoft and is a microcomputer implementation of the UNIX operating system. UNIX is a trademark of Bell Laboratories.



EAGLE POWER

Sky-high performance. Down-to-earth cost.

Eagle clears the air on what it takes to buy a computer.

Forget the heavy price you thought you'd have to pay for a top-rated computer or word processor.

Nobody – but nobody – gives you more for the money than Eagle.

The era of unnecessary cost and confusion is over, once and for all.

Eagle Power: a complete package.

A self-contained system that is fully functional with no expensive "standard options" to buy later. Just plug it in, flip the switch, and you're in business.

You get *word processing* software that speeds letters, reports, mailing lists. And stores them for easy recall.

You get *financial planning* software, an "electronic worksheet" with full "what if?" capabilities.

You get the *CBASIC® programming language* that lets you create custom software for your special business needs.

You get the *CP/M® operating system* that allows you to choose

from the largest selections of software available today. And Eagle offers both flexible disk storage and integrated or add-on hard disk storage.

New 16-bit Eagle Power: high-speed performance.

Here's Eagle Power that's 3 to 4 times faster than the IBM PC. What's more, it is both disk-compatible and software-compatible with the IBM PC. And any board made for the IBM PC can be plugged in for the same operational capabilities. The new 16-bit Eagle is a multi-user system with networking capabilities.

See Eagle Power in action today. For names of Eagle dealers nearest you, phone toll-free 800-538-8157, Ext. 938.

In California 800-672-3470, Ext. 938.

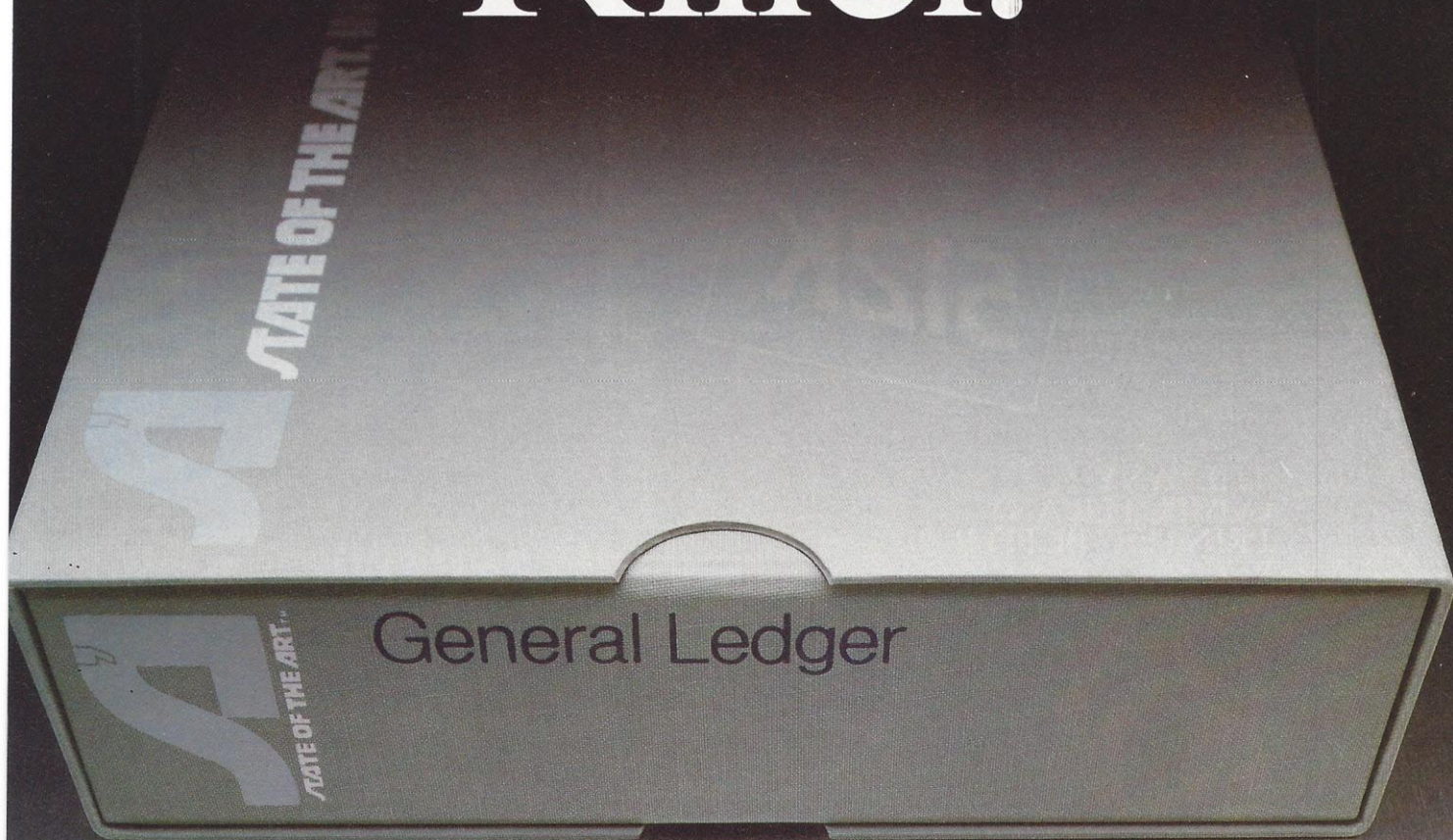


EAGLE COMPUTER

Above and beyond.

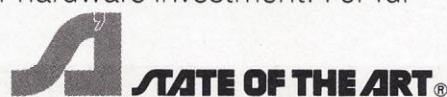
CP/M is a registered trademark of Digital Research, Inc.
CBASIC is a registered trademark of Compiler Systems, Inc.

Pain Killer.



If you're trying to use a desktop computer to run your business, you probably know all about the pain of unprofessional software. Luckily, now there's a solution. Professional software from State of the Art. Nothing else comes close to our flexibility for accounting and other business applications on the Apple II, Apple ///, and IBM PC. Software that grows as your business grows, that can be transferred to hard disk, even tied into a local area network that lets you communicate and share information. See your dealer for a 10 minute demo. He can help ease your pain and protect your hardware investment. For fur-

ther information and the name of the authorized dealer near you, write State of the Art, Inc., 3183-A Airway Avenue, Costa Mesa, CA 92626.



STATE OF THE ART®

The only standard in microcomputer software.

Compute While You the Buffer that

Your computer is a real whiz when it comes to time. Like you, it works fast. But most printers don't. Most printers are *slow*. If you ever have to wait for your printer you are wasting time. Valuable time.

But with Microfazer, there's no more waiting.

Microfazer is the print buffer that frees your computer. That lets it work fast. That helps you work faster, too.



any data processing environment, it's truly the "any computer any printer" buffer. With models for any data transmission need. Serial or parallel. Or to interface in-compatible devices. And

there's always the traditional Quadram Quality.

The assurance you are getting the finest buffer available.

MICROFAZER

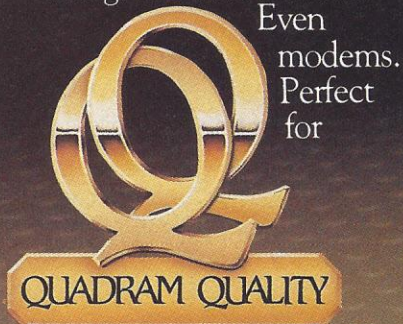
REMEMBERS IT ALL

Microfazer stores data from your computer in its own memory, then sends it to the printer at a rate the printer can handle. And Microfazer can be expanded at any time to meet all your future requirements. The print buffer that offers 512K of memory—a full half-megabyte—Microfazer can handle *any* buffer task.

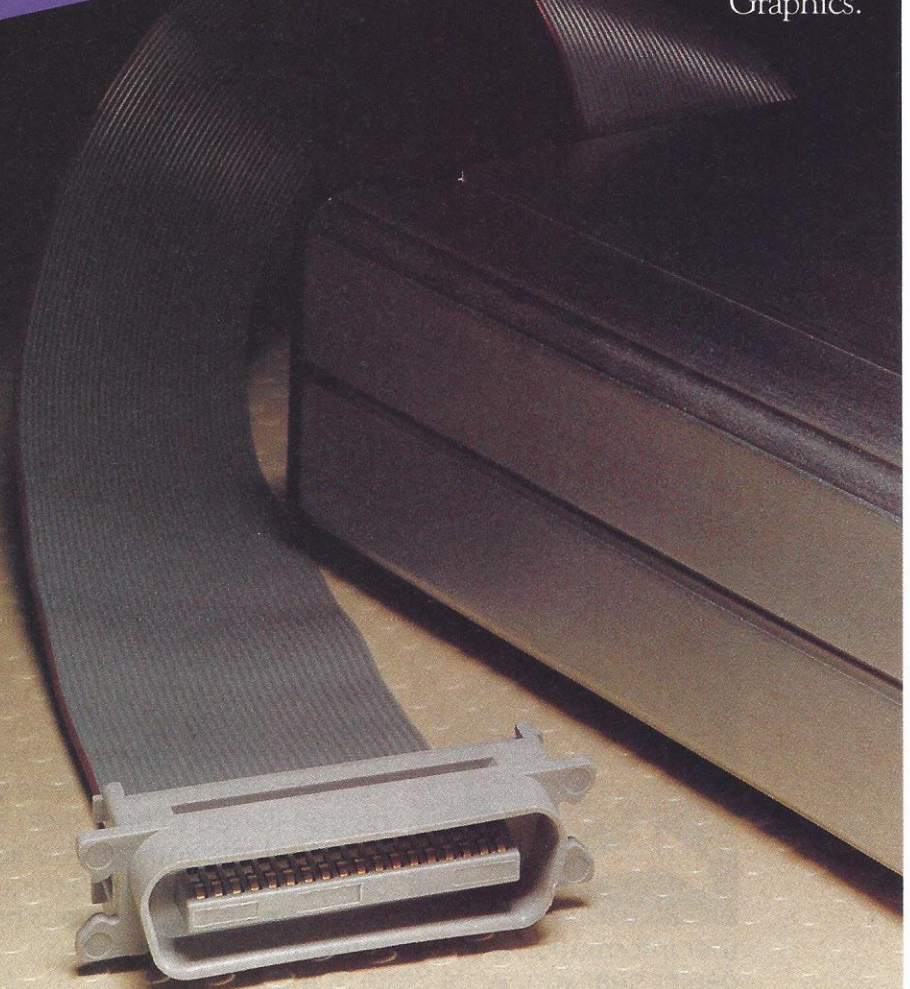
Word Processing.
Accounting.
Graphics.

THE "ANY COMPUTER ANY PRINTER" BUFFER

Microfazer goes with anything. Printers. Plotters.



Even modems.
Perfect for



Available at retail stores worldwide.

Print with Microfazer,TM Remembers It All.

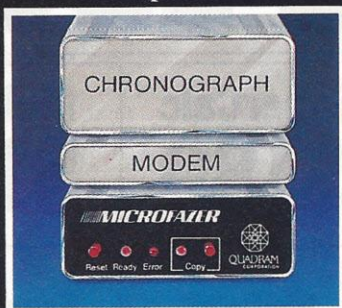
You name it.

So stop worrying about losing vital data because you run out of buffer space. Whatever the job—no matter *what* the size—Microfazer remembers it all.

BUT MICROFAZER REMEMBERS MORE...

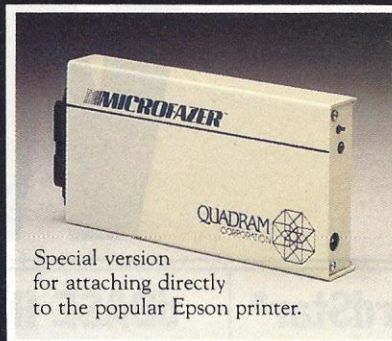
Microfazer remembers to give you the hardware features you're looking for in a print buffer. Features that include a Ready LED, manual Reset and Pause/Copy buttons. And Microfazer comes in a variety of convenient sizes. To

stand alone or stack with other peripherals. To snap onto the back of the popular Epson printer. There's even a model that plugs inside an Epson!



AND PRICED RIGHT, TOO

And with Microfazer you don't have to wait because of price. Parallel to parallel versions start at \$159 (8K), serial to parallel and parallel



Special version for attaching directly to the popular Epson printer.

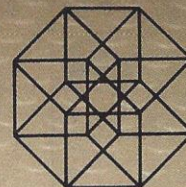
to serial versions start at \$199 (8K with cable), and serial to serial versions start at \$229 (8K with power supply).

Available in models from 8K to 512K.

So stop waiting on your printer. Compute while you print with Microfazer. You'll never have to wait again.



MICROFAZER.
THE PRINT BUFFER.
THAT REMEMBERS IT ALL.



QUADRAM
CORPORATION
A Division of Intelligent Systems.

CIRCLE 46

4357 Park Drive / Norcross, Ga. 30093 / (404) 923-6666
TWX 810-766-4915 (QUADRAM NCRS)

**CP/M[®]
IBM[®]
APPLE[®]**

PRICE WAR!

WordStar[®] \$269	dBASE II[™] \$489	SuperCalc[™] \$189	Multiplan[™] \$199	Perfect Writer[™] \$289
WordStar[®] MailMerge[™] \$369	WordStar[®] dBASE II[™] \$749	VisiCalc[®] \$189	SuperWriter[™] \$249	InfoStar[™] \$299

A.L.S.[™]
Z-80 Card \$129
CP/M Card \$359
ASPEN SOFTWARE[™]
Grammatik \$ 60
Random House Proofreader \$ 39
Random House Thesaurus \$119
ASHTON-TATE[™]
dBase II \$489
COMPUTING[™]
Power \$119
CONTINENTAL SOFTWARE[™]
Home Accountant CALL
DIGITAL RESEARCH[™]
CBASIC \$109
CB-80 Compiler \$379
PASCAL/MT+ \$259
Access Manager \$225
CBASIC 86 \$149
PASCAL/MT+ 86 \$299
Concurrent CP/M 86 \$259
FOX AND GELLER[™]
Quickcode \$229
dUtil \$ 69
dGraph \$229
HOWARD[™]
Tax Preparer (Apple) \$179
Tax Preparer (IBM) \$189

IUS[™]
Easywriter II \$239
Easyspeller II \$139
Easyfiler \$269
Financial Management Series CALL
LEXISOFT[™]
Spellbinder \$259
LIFETREE SYSTEMS[™]
Volkswriter \$145
METASOFT[™]
Benchmark \$379
MICROLAB[™]
Tax Manager \$179
MICROPRO[®]
Wordstar \$269
Wordstar/MailMerge \$369
Wordstar/MailMerge/SpellStar \$509
Wordstar/InfoStar \$549
InfoStar \$299
CalcStar \$ 89
DataStar \$179
SuperSort \$149
SpellStar \$149
ReportStar \$229
DataStar Update CALL

MICROSOFT[™]
Softcard \$259
Ram Card \$ 89
Videoterm (Videx[™]) \$269
All Three Above \$509
Multiplan \$199
Enhancer II (Videx[™]) \$119
BASIC 80 \$275
BASIC Compiler \$295
COBOL Compiler \$549
FORTRAN 80 \$349
Flight Simulator \$ 45
MICROSTUF[™]
Crosstalk \$135
OASIS[™]
The Word Plus \$129
Punctuation and Style \$109
ORGANIC[™]
Milestone \$269
PEACHTREE[™]
Series 4 PeackPak (GL, AR & AP) \$369
PERFECT SOFTWARE[™]
Perfect Writer \$289
Perfect Speller \$169
Perfect Writer/Speller \$389
Perfect Calc \$169
Perfect Filer \$279
All Four Perfect Products \$749

PICKLES AND TROUT[™]
CP/M for TRS Model II \$169
CP/M for TRS Model 16 \$189
Hard Disk CALL
SILICON VALLEY SYSTEMS[™]
Word Handler \$149
List Handler \$129
SORCIM[™]
SuperCalc \$189
SuperWriter \$249
SpellGuard \$129
TCS ACCOUNTING[™]
Accounting Package (4 Modules) \$289
GL, AR, AP, PR or Inv. Mgmt. \$ 99 ea.
VISICORP[®]
VisiCalc \$189
VisiTerm \$ 85
VisiDex \$189
VisiFile \$249
VisiSchedule \$249
VisiTrend/Plot \$249
Business Forecaster \$100
Desktop Planner \$249
FLOPPY DISKETTES
(Boxes of Ten)
8" \$ 25
5" (SS) \$ 25
5" (DS) \$ 35

TO ORDER, CALL TOLL-FREE:

800-227-4587

In California, 800-622-0678
or 415-644-3611

CA residents add sales tax.

OR WRITE:

800-SOFTWARE, INC.

3120 Telegraph Avenue,
Berkeley, CA 94705

800-SOFTWARE



- ☐ Purchase orders accepted.
- ☐ Prompt UPS 3 day Blue Label.
- ☐ Call for shipping charges, *free catalog*, and other low software prices.
- ☐ Now open Mon. - Sat.
- ☐ International and national dealer requests welcome.
- ☐ Quantity discounts available.
- ☐ Prices may change.

© Copyright 800-Software 1983

NEC's new letter-quality printer gets personal with IBM.

The Spinwriter™3550 lets the IBM PC get down to business.

NEC's new Spinwriter letter-quality printer is the *only* one plug-compatible with the IBM Personal Computer. So you get the business applications you've been wishing for. Letter-quality output for word and data processing. Multi-language, scientific, and technical printing. Simple forms handling. Quiet operation. And the reliability of the industry's most popular printer line.

NEC designed the new Spinwriter especially for the IBM PC. It comes complete with documentation and training materials to fit your PC user's handbook. Just plug the Spinwriter in and your PC instantly becomes more versatile and flexible.

More than 8 forms handlers and 50 print thimbles boost PC versatility.

NEC designed the Spinwriter's 8 modular forms handlers to accommodate a wide range of paper and document sizes and types. The easily mounted handlers let your computer print out the forms you

need for data processing, word processing, graphics, accounting or other business applications.

The Spinwriter's 50 print thimbles can more than triple your PC's usefulness. They come in both constant pitch and proportional-spaced fonts, plus in foreign language, technical and scientific versions. They snap in and out in seconds, and let you print up to 203 columns on 16-inch paper. They each last for more than 30 million impressions.

This printer's special features make everything look better on paper.

The Spinwriter's software-invoked features include automatic proportional spacing; bidirectional, bold and shadow printing; justification; centering; underlining; and sub/super scripting, all at speeds up to 350 words per minute.

That big extra, Spinwriter reliability.

Spinwriters have the industry's best mean-time-between-failure rating, in excess of 3,000 hours. In terms of average personal computer usage, that's more than five years.

The Spinwriter 3550 is available at **ComputerLand** stores, **Sears Business Systems Centers** and **IBM Product Centers** nationwide.

NEC Information Systems, Inc.
5 Militia Drive, Lexington, MA 02173

Send me more information on the Spinwriter 3550.

Name

Title

Telephone

Company

Address

City

State

Zip

PLC 0583

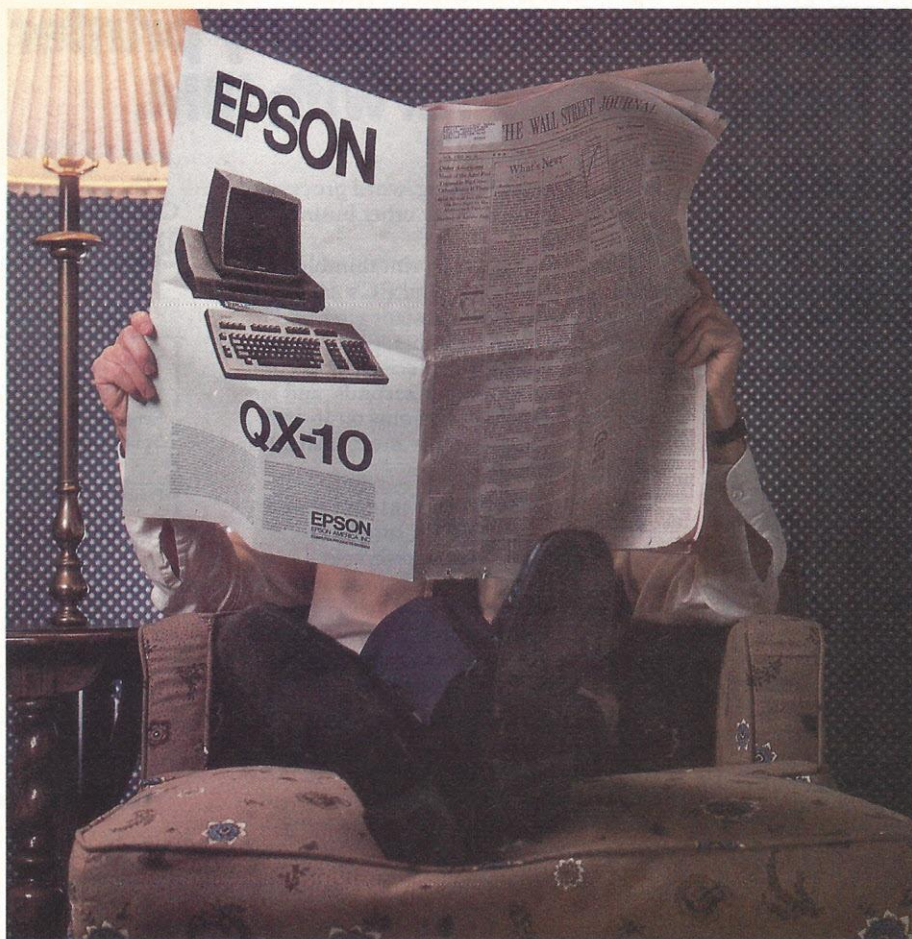
NEC

NEC Information Systems, Inc.

We're Made

for Each Other.





The QX-10.
No ad can do it justice.

Epson.

There's an awful lot of computer hype these days. And we think it's time for a little old-fashioned honesty.

So we're going to give you a few solid reasons why — even if you look at nothing else — you should go to your dealer and take a close look at the new Epson QX-10.

Anybody can use it.

What makes the QX-10 the most remarkably usable computer to date is a unique software system called VALDOCS, coupled with a new keyboard design called HASCI. VALDOCS reduces the time it takes to master the QX-10 from hours to minutes by displaying exactly what your options are, while the straightforward, detachable HASCI keyboard places all the most-used functions right in front of you, grouped logically and labeled in plain English.

You may never buy software again.

VALDOCS may be all the software you'll ever need. Right out of the box it's a sophisticated *word processor*; an *information indexer* for easy access to files; an *electronic mail system*; a *calcu-*

tor; an *appointment book and notepad*; and a *high resolution business graph drawing system*.

A little price tag.

Mere words are not enough. To fully appreciate the powers of this machine, you must experience it for yourself. So visit your dealer and see what it can do. And if that doesn't sell you, the comfortable price tag will. It sells for under \$3000. And that's no hype.



EPSON
EPSON AMERICA, INC.
COMPUTER PRODUCTS DIVISION

Call (800) 421-5426 for the Epson dealer in your area.

CIRCLE 11

Will Easy Computing Make Languages Obsolete?

In this monthly column "Answers" we will respond to your most frequently asked general questions about personal computing. Please send your questions to: Answers, Personal Computing, 50 Essex St., Rochelle Park, NJ 07662.

Q. In the February 1983 issue of *Personal Computing*, you had an article called "A New Generation Arrives" that dealt with recent computer advances. You said an era of easy computing, where more efficiency is achieved with little cost in time and effort, is finally upon us. Does this mean that complicated programming languages like FORTRAN and COBOL will become obsolete?

A. Not at all. What it does mean is that people who want to use the computer as a tool will, in all probability, have less reason to learn those languages.

Here's the way it works. New hardware coming into the field has terrific capabilities compared with what was available just two years ago. Specifically, the low-cost 16-bit microprocessor can address 1 Mbyte of memory directly, compared with the 64k maximum of the 8-bit devices. While you might never be able to conceive of an application requiring that much storage, you would probably not be thinking of all the possibilities. If you want to make a computer program really easy to use, you need to put in a lot of instructions that take the thinking away from the user.

Take the mouse, for example. This small, screen-pointing device allows you to "pick" items from an on-screen menu simply by "pointing" to the item and pressing a button. You don't

have to think about the computer at all. Just point to what you want.

That's great, but it means that somehow the computer has to understand what you're doing with the mouse. The computer has to have a program somewhere that can "read" the position of the mouse on the table top, translate the real position of the mouse into a virtual position relative to the screen display, and move the cursor to the virtual position on the screen that corresponds to the real position of the mouse.

Not only that, but the mouse-driver program also has to check constantly to see if one of the control buttons has been pushed, and it has to know what the user wants to do when he pushes a button.

The mouse driver resides in memory, which means that a computer using a mouse as an input device needs more memory than one without a mouse.

The particular computer we talked about in that article, the LISA from Apple, also has a complex on-screen display. It can put many different displays onto the same screen, and the only way it can do that is to have the different information available to be shown at a moment's notice. It also needs a program to decide what to display and what not to display. The information and program take a lot of memory.

While the easy computers that are coming along need lots of memory and lots of programming to make them easy, you won't have to program them to get your job done.

But someone has to program them. LISA was programmed by the Apple engineers who worked on the project. They did it in Pascal, a complicated programming language more so-

phisticated than either FORTRAN or COBOL. The integrated software packages, like The MBA from Context Management and 1-2-3 from Lotus Development, were programmed in complicated programming languages.

What if you want your computer to do something that no one's written a program for? Say you want it to listen for a baby's cry in another room, and ring a telephone if that cry is detected. You'll have to program it to do those things, and you'll need a programming language to do it. The complicated ones, like FORTRAN, COBOL, and Pascal, are a lot easier to program than the simple ones, like BASIC and assembly language. But it doesn't look like the languages will go away. It does look like the average user will do less programming as the systems improve.

Q. I've seen a lot of articles that divide software into three categories: software for Apples, CP/M software, and other. I understand what machines are in the Apple group, but what common personal computers are in the CP/M and other categories? The software for one group doesn't seem to be applicable to the other two groups. How do you know what group a particular program is for? Finally, is any one group inherently superior to any other?

A. Common CP/M machines include the Osborne 1, the Kaypro computer, many of Cromemco's machines, and others. In addition, many machines can be retrofitted to run CP/M, or you can get CP/M as a simple software package. The Commodore 64 and the Apple II can be retrofitted (just plug in a card), and

the monitor that stands alone



⊗ **TAXAN** manufactures a complete line of high quality monochrome (green and amber), as well as medium and high resolution RGB color monitors. Our monitors are in use around the world on IBM and Apple as well as most other personal computers.

See your local ⊗ **TAXAN** dealer, or call us for details.

CIRCLE 13



TSK Electronics Corporation
18005 Cortney Court
City of Industry, CA 91748
(213) 810-1291

the IBM Personal Computer has an optional CP/M-86 operating system.

Other computers include the Commodore machines, the Atari computers, Texas Instruments's computers, Radio Shack's computers which run an operating system called TRS-DOS, and, of course, all the 16-bit computers that run MS-DOS as does the IBM Personal Computer.

When you buy a software package, you can tell which computer it runs on because the packages are clearly labeled as to the type of machine, the memory required, and any peripherals required or recommended for the package.

Finally, no one group of packages is inherently superior. Software is written for a particular computer to do a particular job. The interesting thing about the groups is that there are a lot of software packages for the Apple, Radio Shack, and for computers which run on the CP/M operating system. For the other computers, the choice is more limited. This will change rapidly in the case of the IBM Personal Computer, for which there is already a wealth of good software, and the Commodore 64, for which software is appearing very quickly.

Q: I had almost decided on a TI 99/4 computer as the one requiring low initial investment, yet providing expansion capability. Then, checking computer magazines showed that other makes, like the Radio Shack TRS-80 and the Atari 400 and 800, are mentioned more often. Why is the 99/4 so neglected?

A: When Texas Instruments first introduced the TI 99/4, it made several moves that industry watchers considered unwise. The machine had a membrane keyboard that was difficult to use. It didn't allow much programming. It had little expansion capability. Finally, the computer wasn't marketed aggressively, so people didn't know what it could do. All this changed several months

ago with the introduction of the 99/4A, an upgrade of the original.

With the development of the new product, an aggressive marketing push including a national advertising campaign, introduction of the expansion chassis, and a lot of software for the computer, magazines will probably start paying more attention to this machine.

Q: What's the IEEE-488 interface, and why is it used?

A: The IEEE-488 interface is a way to get signals onto the IEEE-488 bus, which is a standard signal bus for computers and automatic electronic instruments. The standard, which was adopted by the Institute of Electrical and Electronics Engineers, a professional organization, was first advanced as a way of interconnecting computers and instruments the computers would control. It's handy for running electronic experiments that go on for hours or days. Most firms conduct such tests on new products to establish their reliability. It also helps to have the bus available if you want to put your measuring instrument in a place that's difficult to get to, or dangerous, like inside the crater of Mt. St. Helens.

But that's not the only use for the 488 bus, as it's called. Commodore put it into its computers early on, and still uses it to hook up common peripherals, like printers and disk drives, to its CBM computers. Osborne has a 488 interface on its Osborne 1 which you can use to hook up parallel printers. Many Hewlett-Packard computers have 488 interfaces. Hewlett-Packard calls its 488 interface the HPIB (Hewlett-Packard Interface Bus) because that's what it called the interface when HP used it before the IEEE adopted it as a standard.

One nice thing about the 488 interface as opposed to the RS-232-C interface, or the Centronics parallel

interface, is its ability to address different devices on the bus. For example, you could conceivably have a printer and a modem hooked onto the same computer port, and send data to one or the other by manipulating software switches. We don't know of anyone who's done that, but we're fairly sure it's been done somewhere in an engineering lab. You can also have two different generic devices on the bus—"talkers" and "listeners." Talkers do only that—send data out onto the bus. Listeners wait until a bunch of data comes their way and then capture it if they "heard" their address with the data package. They then do whatever they're supposed to, depending on the instructions included in the data they just heard. Talker/listeners do both. A computer controlling a network of remote devices, seismometers, tilt meters, and the like, is a talker/listener. It can instruct the devices on the bus, and gather data those devices send back.

You can see that all this takes programming to make it work. The computers that have the 488 interface built in have software to make their standard peripherals operate on the bus. If you wanted to do something else, you'd have to configure your port-driver routines to handle the other function. But the possibilities seem endless.

Q: The subject of running the CP/M operating system on the Commodore 64 is still a mystery to most users because the Z80 boards for the 64 are just beginning to become available. Shouldn't the availability of CP/M also influence the decision of disk drive for the computer? I believe the CP/M standard format is the 8-inch floppy disk, while Commodore seems to be pushing the Model 1541 5¼-inch drive.

A: CP/M is software, and as such doesn't need any particular disk size for its operation. While it's true that many programs for CP/M

TODAY'S PRODUCTIVITY IS TOMORROW'S PROFIT.

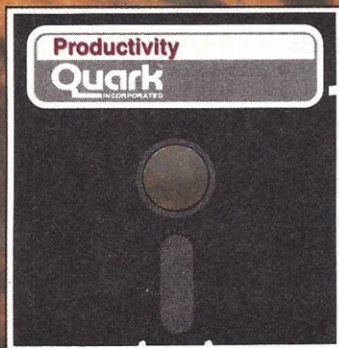
That's why Quark designs office automation software to increase your productivity. With programs that will dramatically enhance your Apple[®] III or IIe. So you'll do more work—more efficiently—in less time—for less money.

And all Quark programs are extremely friendly. So you can devote your efforts to using them, not learning them. Yet you'll discover many sophisticated features no other software can offer.

Find out for yourself. See your dealer today for a complete demonstration of our Word Juggler[™] word processing system. And innovative utilities programs, such as our Catalyst[™] hard disk boot.

Because tomorrow belongs to the productive. And who wants to be left behind in yesterday?

Quark Incorporated,
2525 West Evans, Suite 220,
Denver, Colorado 80219,
(303) 934-2211.



Quark
INCORPORATED
Office Automation
Software

CIRCLE 14

Apple is a registered trademark of Apple Computer, Inc.

do come on the larger disks, they don't have to. Osborne computers use CP/M. All the CP/M software that runs on Osborne machines is supplied on the 5 $\frac{1}{4}$ -inch disks, because that's the size of the disk drives that come with the Osbornes.

So you can get the smaller drives for the Commodore, and get CP/M on the smaller disk drives. At first, you may find that CP/M programs formatted specifically for the Commodore 64 are a bit rare, because the computer is so new. So while the operating system on 5 $\frac{1}{4}$ -inch floppy disks is available, it might need specific tailoring to make it work on the 64. There are utility programs in CP/M to handle this chore, although it may be a bit difficult, as we found out in configuring the Osborne's CP/M system to run with a Spinwriter printer. But it turns out that if you have almost any unusual combination of hardware you'll have to configure CP/M to recognize it, so the 64 shouldn't be different from any other computer in this regard.

Q. I can combine a Scott amplifier, a Fisher tuner, a Garrard turntable, a Panasonic tape recorder, and Radio Shack speakers, and have an acceptable stereo system. I can put a Buick 455-4 engine in a Ford by using an engine-to-transmission adaptor housing. Can I do the same thing with computer hardware and software? How many computer and software brands are compatible?

A. It may not be immediately obvious, but there's a lot of compatibility in the computer business, which has come about through the adoption of interconnect standards, just as it did in the audio and automotive fields.

First of all, most software publishers make their software available in a variety of formats for different computers. Thus, you'll find VisiCalc, to name just one, available on almost every computer with enough memory

to run the program in the first place. Another example is dBASE II. It's available in a CP/M version for computers that run that operating system, a version for the IBM Personal Computer, and a version for the Apple II with a CP/M card. So the bottom line here is that a lot of software cuts across a number of hardware manufacturers' product lines. This isn't always true, because some machines have different capabilities from others. But you can always play a mono record on a stereo system, too. It's just that the performance won't be quite as good. The same can be said of software. If a package is designed to support a color display, and you have a black and white monitor, you can use the software, but you'll miss out on the color.

Hardware compatibility is another matter. But even here, a great degree of compatibility exists. We just had the enlightening experience of having to hook up an NEC 7710 Spinwriter to two different computers—an Osborne I and an Apple II Plus. We'd like to be able to say it was a simple task in both cases, but it wasn't. We got the Apple connection going first, using a California Computer Systems serial I/O (input/output) card. We had to set the baud rate (the data-transmission speed) on both the card and the Spinwriter, and make sure the connection was OK. Then we tested the operation using a word processor, and found that for this configuration we needed to send some characters to the printer to make it line feed properly.

The Osborne was something else again, because we had to get into its CP/M operating system to make sure everything was set up right. Somehow we got mixed up in the documentation and couldn't figure out just how to set up the system, so we kept getting garbage on the printer. Finally, we started to throw software switches in desperation, and one combination we should have thought of in the the beginning worked. We had to

tell the computer that we had a 5510 Spinwriter connected to it, and it worked just great with the 7710.

The point here isn't the difficulty we had, nor is it the elation we felt when the combination finally worked. The point is that the compatibility between this printer and two very different computers exists.

The same holds true for disk drives, monitors, plotters, add-in memory, modems, terminals—you name it. Manufacturers of these devices make them with interconnect standards which allow you to connect them to almost any computer. The only thing you need to do is read the instruction manuals to see how the computer and the peripheral are connected.

You're likely to run into snags as we did. But we remember very well the time we put a '72 VW Beetle transaxle into a '58 Karmann-Ghia. We wound up welding a bracket together that would account for the different clearances on the old body and the new transmission. We just had to fiddle a little bit.

Q. I have heard from others, and I know from my own experience, that computer disk drives have to be adjusted twice a year. I have also learned that this is going to cost about \$40 an hour. This is ridiculous! I can not afford to do this to both of my drives. Is there a cheaper way, such as doing it myself? Will hobbyists ever escape from this type of computer-store monopoly?

A. Electronics technicians are expensive these days. They have to be paid what they're worth, and the computer store has to charge you for the use of its services. If you think that charge is bad, try getting your car fixed at the dealer's service department.

That doesn't take away the pain, though. We suggest you shop around. If your dealer charges what seems to you an outrageous figure, then try

NEVER INVEST IN SOFTWARE AGAIN!

unless you can "test" it first, from
United Computer's SOFTWARE RENTAL LIBRARY

You can now RENT the most popular software available for just
15% of Manufacturers' Retail Price

- Eliminate the risk—rent first!
- All purchases are 20% Off of Manufacturer's Suggested List
- 100% of rental fee applies toward purchase
- Rentals are for 7-days (plus 3 days grace for return shipping)

There are now 2 different plans to choose from:

Join the **Game Group** for only \$50.00 per year and receive your first computer game rental **FREE**. Then rent as many games as you like for only 15% of Mfrs. Sugg. Retail Price.* Minimum order, 3 game rentals

Join the **Business Group** for only \$125.00 per year and receive your first rental **FREE**. Then rent as many business application programs as you like for only 15% of Mfrs. Sugg. Retail Price.*

REMEMBER, THESE ARE NOT DEMOS, BUT ORIGINAL UNRESTRICTED SOFTWARE PROGRAMS

(complete with manuals in original manufacturers' packages)

To Immediately Order, or for more information:

Money Orders or credit cards



Checks allow 2 weeks

*plus postage and handling. Some programs may require 2-4 weeks delivery.

BUSINESS HOURS

Mon-Fri: 8:30-5:30
Saturday: 8:30-2:00
Pacific Time Zone

Toll Free CALL 1-800 992-7777

In California CALL 1-800 992-8888

In L.A. County CALL 1-213 823-4400

others. See if you can get a price for the job on a flat rate, rather than an hourly figure. The flat-rate price might turn out to be OK.

There might be another alternative. Maybe you can get a maintenance contract on the drives alone that will prove more affordable. One advantage with such a service is that you'd be covered in case of a catastrophe.

We do not recommend that you try to service your drives yourself. If you decide to adjust the drives yourself, you could set them up so they don't read your disks, or worse, they might damage your disks and you'd have to lug the drives to the computer dealer anyway.

Q. I need to use both a dot-matrix and a letter-quality printer with my Apple computer. I've heard you can save money (and expansion slots) by getting a single printer interface card that can drive both printers. Is this true?

A. Mountain Computer, Videx, and SSM are some of the firms that make multifunction cards like the one you described. They have a serial output (suitable for a letter-quality printer) and a parallel output (suitable for a dot-matrix printer). Besides conserving slots and dollars, they also draw less current from the power supply.

When you install the interface card, its configuration program asks you to assign the different interface card outputs to the expansion slots of your choice. Say your interface card is in slot 1. You could assign the parallel output to slot 1 also. Then you could have the serial output emanate from slot 4, even though the card itself stays in slot 1. You might even have a different card in slot 4, though that can get tricky. When you assign a function to a slot the card doesn't occupy, it's called "phantom" slot assignment.

You do have to get two copies of

your word-processing software, one configured to output printing through slot 1, the other through slot 4, as per our example.

Q. What are the odds that a computer, printer, and disk drive will still be in operating condition if I order them by mail and then UPS dropkicks them across the country?

A. UPS's parcel handling aside, the odds are pretty good that hardware in its original packing will survive the shipping ordeal. The mail-order houses we asked said shipping damage was "not a major problem" for them. It makes more sense for manufacturers to spend a little extra on foam rubber or Styrofoam than to spend a lot replacing or repairing damaged merchandise. This is, by the way, an excellent reason for customers to keep the original packing their equipment arrives in. If you ever need to mail it yourself, for service or other reasons, that factory-engineered packing is your equipment's best chance for survival.

Q. Does anyone make a disk drive for Commodore computers besides Commodore?

A. As far as we can determine, if you want a disk drive for the VIC-20 or the 64, you'll have to buy it from Commodore. In part, this is due to the fact that Commodore uses an unusual bus for connecting peripherals, and other manufacturers would have to go to considerable lengths to produce a Commodore-compatible disk drive. There is one lower-priced alternative to the Commodore disk drive you might consider: the Exatron ESF-2064 Stringy Floppy System (Exatron, 181 Commercial St., Sunnyvale, CA 94086). This system, which costs less than \$200, stores data on tiny endless loop tape cartridges, and is a good compromise between tape cassettes and disk drives.



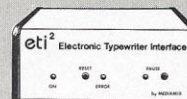
PRINTER OPTIMIZER



Why buy a mere "spooler" when you can have THE PRINTER OPTIMIZER?

- * 64k to 256k spooling buffer
- * adapts different brands - can mix Serial and Parallel
- * character conversion: 1 to 1, 1 to many, many to 1, ignore
- * pushbutton automated access to your printer's various type styles and printing modes
- * several ways to PAUSE printing
- * access any character, graphic design or printer "trick" from any program at any time
- * special features for use as a MODEM buffer

ETI²



The cost effective alternative. Converts IBM, Adler/Royal, Olympia and other Electronic Typewriters into letter quality printers.

- * 2K memory buffer
- * access all typewriter characters and automated features
- * Serial or Parallel versions
- * Many proprietary features and commands insure compatibility with your system and software
- * Typesetting capability!

PETI²

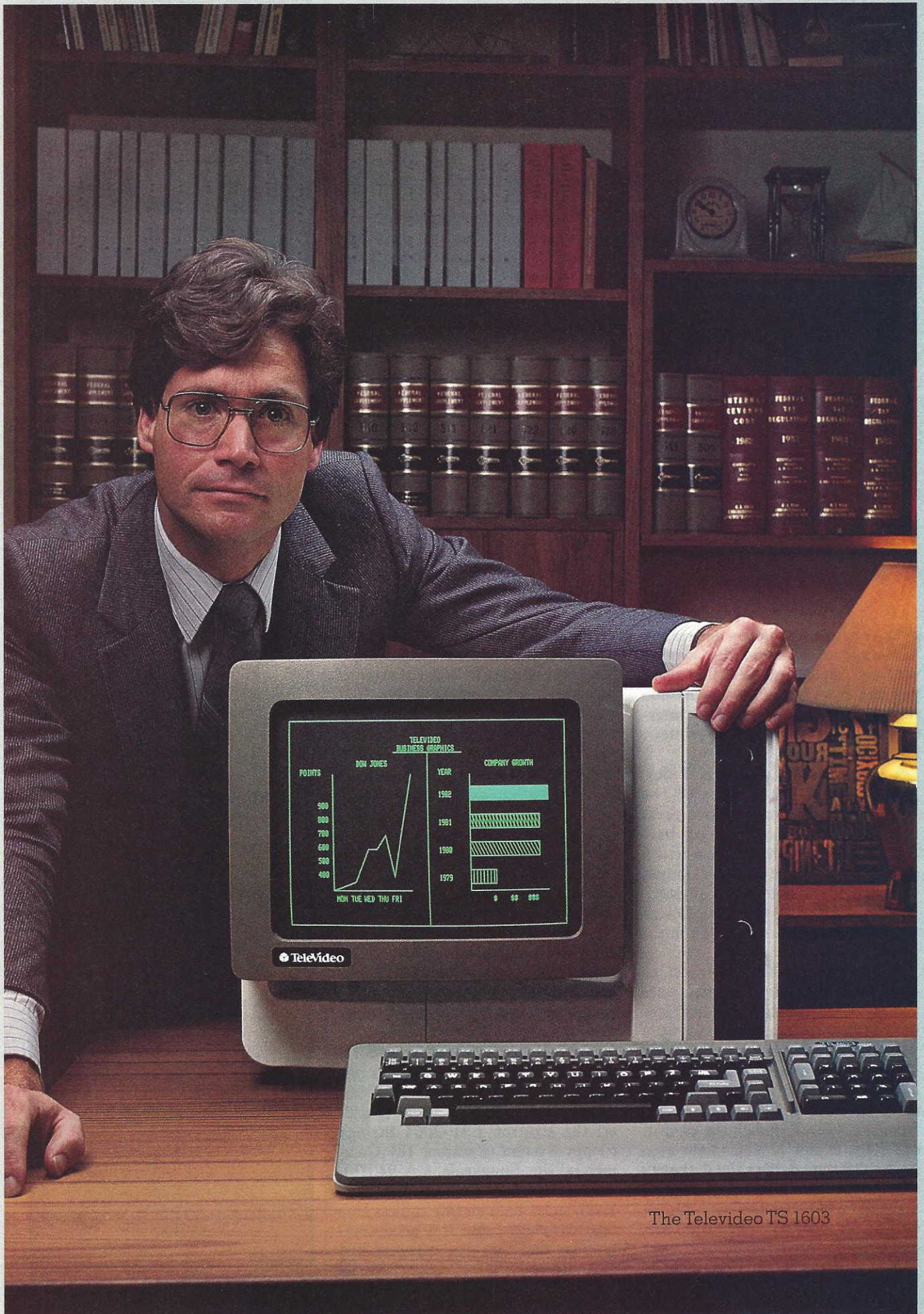


Super low cost adaptor for new inexpensive portable Electronic Typewriters can yield typewriter and letter quality printer combination for around \$500 total!

- * perfect for "personal use"
- * easy "plug-in" Parallel connection to most computers
- * compatible with popular word processing programs

APPLIED CREATIVE TECHNOLOGY INC.

2723 Avenue E East, Suite 717
Arlington, Texas 76011
(817)-261-6905
(800)-433-5373



The Televideo TS 1603

"I chose TeleVideo's Personal Computer for all the things IBM left out."

I didn't choose TeleVideo because it's \$1,000 less than IBM.* It was because TeleVideo thought of everything.

To begin with, my TeleVideo has twice as much storage capacity as IBM, even with the extra cost IBM disk drive. I can use that extra capacity.

My TeleVideo came with a big 14" screen that's easier to read, and it tilts for the extra comfort that's so important when you use a computer as much as I do. With IBM, you pay more for a smaller 12" screen that doesn't tilt at all.

Another thing I like. TeleVideo's keyboard is so lightweight and comfortable my fingers hardly know they're working. IBM's keyboard? It's a little behind the times.

TeleVideo also gave me the choice of popular CP/M® or MS-DOS® operating systems — FREE — so I can pick from thousands of proven software programs. You can get the same option from IBM, but you have to pay for the privilege.

Last but not least, TeleVideo's network capabilities give me a real growth path

for the future, linking up to sixteen computers in one powerful network. You can't get that from IBM.

So before you choose any personal computer, do like I did and compare. You'll see that TeleVideo gives you a lot more computer for a lot less money. And you'll buy TeleVideo because they didn't leave anything out.

For more information, write TeleVideo Systems, Inc., 1170 Morse Ave., Sunnyvale, CA 94086, call toll-free 800-538-1780 (In California call 800-672-3470 Ext. 945), call one of our authorized distributors or dealers, or contact one of our regional sales offices, listed below.

Northeast Region, 617-369-9370

Eastern Region, 703-556-7764

Southeast Region, 404-447-1231

Midwest Region, 312-969-0112

South Central Region, 214-258-6776

Northwest Region, 408-745-7760

Southwest Region, 714-752-9488

European Sales (Holland), (31) 075-7461

UK/Scandinavia Sales, (44) 0908-668-778

TeleVideo Systems are fully serviced nationwide by TRW.

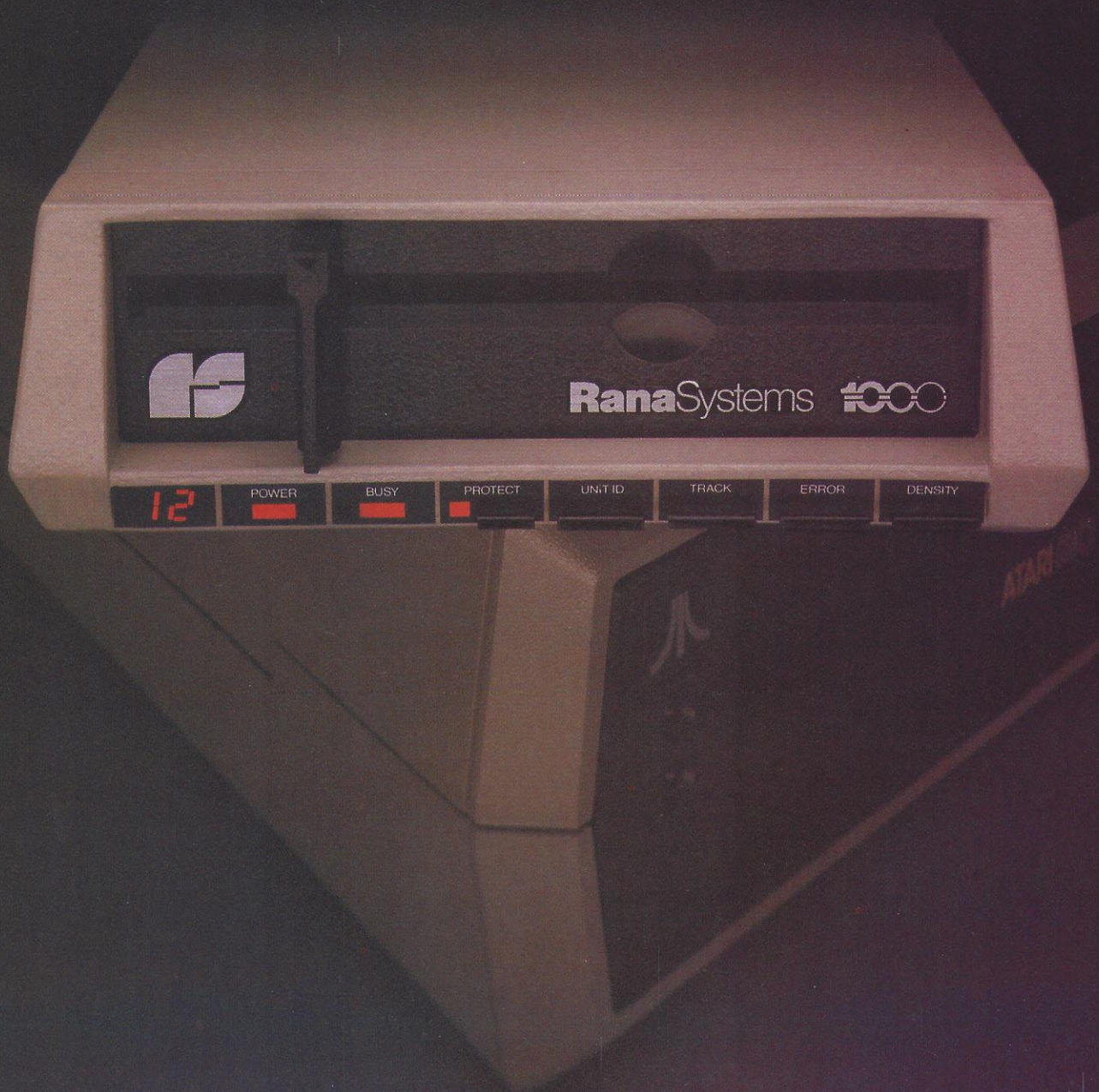
*Based on manufacturer's suggested retail prices for comparably equipped computer



TeleVideo Systems, Inc.

CIRCLE 15

**We just made
owning an Atari computer
a lot more logical.**



Introducing the Rana 1000 disk drive. It's a whole new game for Atari computers.



This two digit LED readout displays a code that tells you everything you need to know.

This beeping button tells you your write protect feature is keeping your information safe.

The remaining buttons beep when touched, and provide readouts on density storage, error status, and drive number.

This button beeps when you touch it, and the LED readout tells you what track you're on.

When Rana Systems introduced the Elite Series of Apple® compatible disk drives, we didn't know what a tremendous impact they would make. It turned out to be a line so outstanding in performance, styling, capacity, and price, that it instantaneously made us a major force in the market. Well, needless to say, the response was so great that we were forced to create the same highly advanced disk drive for Atari.® A disk drive that when coupled with Atari's computer, could perform everything from accounting, financial planning, and stock charting, to word processing, business management, and letting you write your own programs. Plus, we made it simple enough for a child to use, for learning anything from the alphabet to a foreign language.

Working with a diskette versus playing with a cassette.

Let's face it. The only reason Atari made a cassette option to their computer was to make it affordable. But now you don't have to settle for less. Because now you can get a diskette for your Atari computer which outperforms their cassette and costs 1/3 less than their disk drive. With Atari's cassette you only get half the functions of a computer compared to what our floppy disk can give you. Their cassette is not only limited in the software available, but it also takes 20 times longer to get the information you need. And Rana's disk

drive offers twice the storage capacity of either their cassette or disk drive.

Why even stylewise our new low profile design not only looks 100 times more spectacular, but it occupies 3 times less space. And our new Rana 1000 also gives you a piece of its mind every time you use it, because our disk drive gives you information as well as takes it. And we think that says a lot.

The disk drive that has all the answers.

Rana offers you a myriad of features Atari couldn't even conceive of. Like five electronic functions on the front panel that actually beep and give you a LED readout when touched. Our disk drive tells you what track you're on, and what density and how much information you're storing. It lets you switch from a single density of 90,000 letters to a double density of 180,000 letters, on a single diskette. And, we have a write protect feature which protects your diskette from being erased. In fact, no other disk drive can offer you that.

As you can see, it was easy to build a disk drive superior to Atari's. Because for every reason you buy a disk drive, Rana has superior technology.

The Rana 1000 disk drive. It brings your Atari computer to a higher level of sophistication for a price one third lower than Atari's. So your choice shouldn't even be a matter of logic.

Just common sense.

RanaSystems



Always a step ahead of the originals.

20620 South Leapwood Avenue, Carson, CA 90746 213-538-2353. For dealer information call toll free: 1-800-421-2207. In California only call: 1-800-262-1221. Source Number: TCT-654

© Apple is a registered trademark of Apple Computer, Inc. © Atari is a registered trademark of Atari, Inc., a Warner Communications Company.

YOU WILL NEVER AGAIN HAVE TO WASTE TIME WAITING FOR YOUR PRINTER.

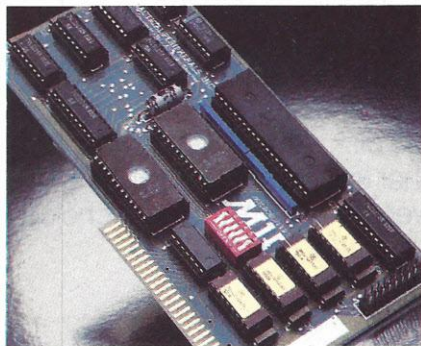
MICROBUFFER ALLOWS YOU TO PRINT AND PROCESS SIMULTANEOUSLY.

Microbuffer will instantly increase your efficiency — and eliminate the frustration of waiting for your slowpoke printer.

Now you can simply dump your printing data directly to Microbuffer and *continue processing*. Microbuffer accepts the data as fast as your computer can send. It stores the data in its own memory buffer, then takes control of your printer.

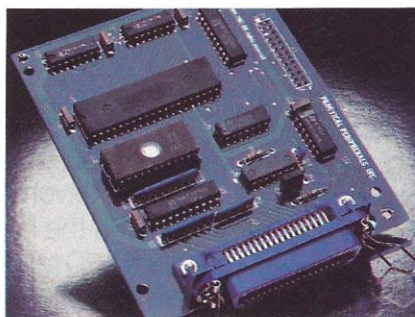
THERE IS A MICROBUFFER FOR ANY COMPUTER/PRINTER COMBINATION.

Whatever your system, there is a specific Microbuffer designed to accommodate it.

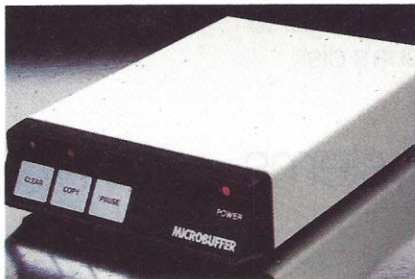


FOR APPLE II COMPUTERS, Microbuffer II features on-board firmware for text formatting and advanced graphics dump routines. Both serial and parallel versions

have a power-efficient low-consumption design. Special functions include Basic listing formatter, self-test, buffer zap, and transparent and maintain modes. The 16K model is priced at \$259 and the 32K, at \$299.



FOR EPSON PRINTERS, Microbuffer/E comes in two serial versions — 8K or 16K (upgradable to 32K) — and two parallel versions — 16K or 32K (upgradable to 64K). The serial buffer supports both hardware handshaking and XON-XOFF software handshaking at baud rates up to 19,200. Both interfaces are compatible with standard Epson commands, including GRAFTRAX-80 and GRAFTRAX-80+. Prices range from \$159 to \$279.



ALL OTHER COMPUTER/PRINTER COMBINATIONS are served by the stand-alone Microbuffer In-line.

The serial stand-alone will support different input and output baud rates and different hand-shake protocol. Both serial and parallel versions are available in a 32K model at \$299 or 64K for \$349. Either can be user-upgraded to a total of 256K with 64K add-ons — just \$179 each.

SIMPLE TO INSTALL.

Microbuffer II is slot-independent. It slips directly inside the Apple II in any slot except zero.

Microbuffer/E mounts easily inside the existing auxiliary slot directly inside the Epson printer.

The stand-alone Microbuffer is installed in-line between virtually any computer and any printer.

MICROBUFFER FROM PRACTICAL PERIPHERALS.

So what are you waiting for? Write to us for more information or ask your dealer for a demonstration.

When you see how much freedom Microbuffer will allow, you'll understand why it's so silly to be without one.

PRACTICAL PERIPHERALS, INC.™
31245 LA BAYA DRIVE
WESTLAKE VILLAGE, CA 91362
(213) 991-8200

Fire-Fighting System Saves Valuable Timberland

Every year, hundreds of acres of national parkland and industrial timberland are destroyed by fire. The cost to the American public is reflected in the loss of natural beauty and in the rising cost of wood products.

In an attempt to reduce the incidence and scale of these devastating fires, the federal Bureau of Land Management in the West has developed a new fire-fighting tool based on personal computers. The bureau is using Hewlett-Packards with graphic display capabilities to pinpoint potential sites for fires and prevent the widespread destruction they can cause.

Many forest fires can be traced to weather conditions or natural phenomena, especially lightning strikes. Using the Hewlett-Packards and a lightning detection system, the bureau is aware of lightning strikes almost as soon as they occur, even if they're several hundred miles away.

This quick detection gives fire fighters a chance to reach the site while the fire is still manageable or, in some cases, before it has even started.

The Automatic Lightning Detection System (ALDS) is currently operating in wooded areas of the West. "Sensors are placed at 250-mile intervals throughout the western United States," says Richard Franklin, a California state fire and aviation management officer.

The sensors pick up the magnetic field of lightning strikes. "A lightning strike has positive and negative ions in it—it has energy," says Franklin. "The positive energy force of the lightning bolt constitutes the magnetic field."

When the sensor picks up a strike, it runs through a positional analyzer, which takes information from the direction-finder sensors. Then the system calculates and enters this information into the central processor and feeds it into graphics terminals.

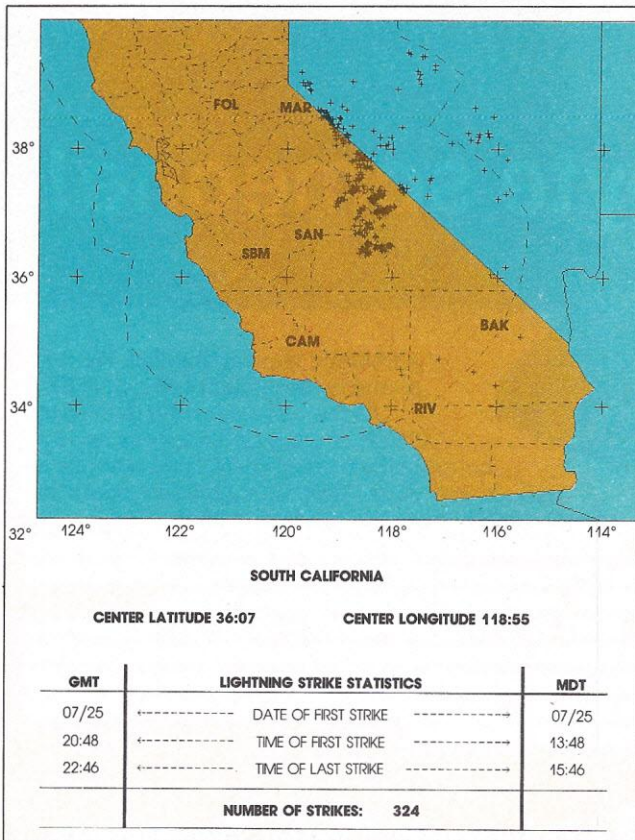
At that point, the system produces a map of the strike area and an information sheet. Both documents include statistics showing the date and time of the first strike, the time of the last strike, and the total number of strikes registered in the area. Another printout gives longitudinal and latitudinal readings of the strike's location. "Within seconds we have real-time information," says Franklin.

When this information has been recorded, a hard-copy map is produced and sent by telecopier to the designated area. Then it's only a couple of minutes before the fire-fighting crew gets to the scene of the potential fire.

The time lapse between lightning strike and computer reading is less than six minutes. As Franklin says, "When you've got such a vast area to scan, time is of the essence. You can't use regular lookout aircraft for this—the space is just too large. Planes fly all around, looking for strikes and fires without knowing exactly where the strikes are occurring."

The system presently monitors approximately 95 percent of 11 western states and Alaska. "It can be used wherever there's a need," says Franklin, "and there are frequent lightning strikes. It's used in the West because the area has a known wildland fire problem."

In many of the timberlands of the western states, forest personnel are stationed in lookout towers where they watch for fires. "Actually, since it [the system] only detects strikes, and not actual fires, it serves to strengthen the position of the lookout person," Franklin says. "He can concentrate his efforts on known fire-watch areas. By consulting our records we can tell where fires caused by lightning have occurred and are likely to occur."



The ALDS produced this map of a known strike area showing the date and time of strikes, and their locations by plus symbols.



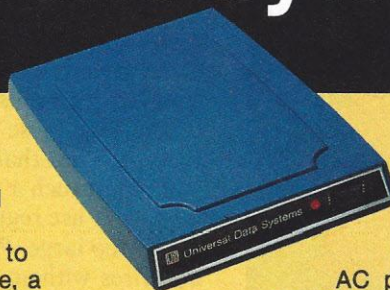
Reach out and byte someone!

Your desk-top computer system is only a beginning — plug a low-cost UDS modem into the RS-232 port and a whole new world of communications opens up!

UDS modems add a new dimension to personal computers. For professional use, a modem permits two-way, hard-copy communication between home office and branches or among the branches themselves. Electronic mail becomes a reality. Sales, cost and inventory updates can be sent over ordinary telephone lines at economical, after-hours rates.

When you use your computer for personal applications, the modem allows you to access up-to-date market information, receive news and weather summaries, check airline schedules or even electronically scan out-of-town newspapers. Long-distance game playing and computer-age personal correspondence become instant realities.

The wide range of UDS modems includes one that fits your requirement perfectly. Top of the line is the micro-processor-based 212 A/D which communicates at 0-300 or 1200 bps, stores and automatically dials up to five 30-digit numbers and includes a complete prompting menu and full



automatic test capabilities. Yet, with all these features, it costs only \$745.

At the other extreme is the \$145 103 LP, offering simultaneous two-way communications at 0-300 bps without an AC power cord. This unit siphons operating energy directly from the telephone line!

In between is a large variety of units — many of them in the LP no-power-supply design and all fully FCC certified for direct connection to the telephone system.

Don't be a computer hermit — treat your system to a UDS modem; then you can reach out and byte someone! For details, contact your favorite computer dealer or Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/837-8100.

 **Universal Data Systems**



MOTOROLA INC.
Information Systems Group

Another valuable feature of the system is its ability to track potentially dangerous weather systems. "Through ALDS, it's possible to actually track a storm," says Franklin. "We can send out, in advance, fire trucks and emergency power sources."

"In the last couple of seasons the system has really proven itself," Franklin says. "The average cost of putting out a fire which has spread over 10 acres or less is \$2000. Fires covering more than 10 acres cost about \$10,000 to extinguish. So early detection of a fire means a potential saving of at least \$2000. And approximately 45 percent of all fires in California are caused by lightning."

"ALDS is a very simple system—programmed to the user's needs," says Franklin. "Computer specialists and

electronic technicians from the Boise Interagency Fire Center come out to make adjustments to the system whenever they're needed."

"This system will eventually be tied up to the IAMS (Initial Attack Management System) weather system. Actually, it will take about two more years. Then we'll be able to determine the probability of fire—because we'll know the wind speed at the time of the strike, whether or not it was raining, and other important information."

ALDS has excited the interest of other groups besides the land management bureau. NASA has hooked into it to track potential weather threats to the shuttle project. The detection stations are contacted from the shuttle for weather, and especially lightning-strike information.

Computer Teaches Math Through Voice Synthesizer

There's nothing like a talking computer to get a kid interested in multiplication tables. At least that's what Dr. Gerald Myers of Scottsdale, Ariz. decided.

Because of a learning disability, Myers's 13-year-old son Kevin was having difficulty in school. "He was more capable of retaining auditory stimuli than visual stimuli," says Myers. This resulted in a low concentration level and a short attention span. Consequently, learning math proved especially difficult for the youngster.

To help his son with his lessons, Myers tried using a tape recorder that repeated various multiplication and division tables. Although this method proved helpful, Myers felt certain there was an even better solution.

He then developed a long math program, written in BASIC for his Heath H-89 computer. With an RS-232-C interface he added a Votrax voice synthesizer. For Kevin, the synthesizer was an important addition. The "voice" helps him retain information and holds his attention. "It's an interactive program," says Myers. "Instructions appear on the screen and it [the computer] also tells him what to do verbally."

The program, called Nivek (Kevin spelled backwards), took Myers four days to write. "I decided what I wanted to do and I just sat down and started writing," he says.

The program does multiplication, division, subtraction, and addition. It begins by verbally asking, "What is your name?" Following the typed response "Kevin," the computer replies, "Good afternoon Kevin. What would you like to practice?" If Kevin chooses division, he simply

types "D," for multiplication he types "M," and so on. The computer then asks if he would like to practice tables or problems. If Kevin chooses a problem and decides he'd like to try another instead, he can change to a new problem, using the program's random number generator.

Although this initial setup was working well, Myers had one problem with the synthesizer—it's extremely phonetic. "The chip has to be able to decode what you're

HAYDEN SOFTWARE AWARDS \$7000 IN NATIONAL CONTEST

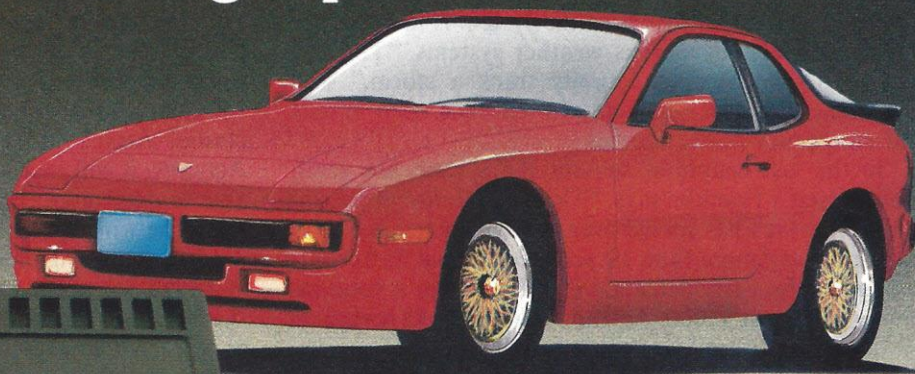
Five national finalists, aged 12 to 19, took home \$7000 in cash and merchandise from Hayden Software Company's Kamikaze Shootout contest held February 21, 1983 in San Francisco. The winner was determined by the highest score obtained after playing three complete Kamikaze games or for six consecutive hours, whichever came first.

First prize of \$5000 went to Christine Drda, 12, of Costa Mesa, Calif. The \$1000 second prize went to 15-year-old Matthew Hill of Brookfield, Wisc. Thirteen-year-old Jason Meggs of Bethesda, Md. took home the third prize of \$500. Allan Thompson, 14, from South Bend, Ind. won the fourth place prize of a \$250 gift certificate. And 19-year-old Robert Stach of Wappingers Falls, N.Y. also won a \$250 gift certificate for his fifth place finish.



Dear Ma:

Racal-Vadic has the Ultimate 212A. It's like getting a Porsche at Volkswagen prices!



**The Auto-Dial VA212...
For Those Who Want Everything**

Racal-Vadic has the ultimate 212A-compatible modem. It operates at 1200 and 0 to 300 bps and has a built-in automatic dialer with a non-volatile memory that can store as many as 15 phone numbers, up to 31 digits each. Non-volatile means the memory is retained even if you lose power.

This remarkable modem "talks" to the terminal operator using English words and phrases to indicate call progress, option status, and telephone numbers in memory. Calls can be originated or answered from the terminal keyboard or the modem front panel.

The front panel is really something, Ma. It has a 16-key tactile-touch keyboard and an eight character liquid crystal display. Twenty-six user programmable options are stored in the modem's memory, and can be keyed in from the front panel... eliminating the need to open the modem to change options.

The VA212LC... For The Economy Minded

For those who don't want auto-dial, Racal-Vadic has the perfect modem. It's called the VA212LC. LC means low cost... just \$550 in single quantity.

This is not a stripped down model. The VA212LC is a full-featured 212A-compatible modem with manual originate and automatic answer. It operates at 1200 and 0 to 300 bps full-duplex.

The VA212LC's extensive diagnostics include remote digital loopback and self test. Remote loopback allows end-to-end testing over the telephone from any of Racal-Vadic's regional diagnostic centers. The carrier indicator shows when you've established connection.



Now there is a real choice in the 212A market... A Porsche at a Volkswagen price... or the Volks itself at an even lower price.

Phone or write Racal-Vadic today!

Your Independent Thinking Son,

Alexander Graham Jr.

PHONE: 800-543-3000, Operator 507

Racal-Vadic Member IDCMA
CIRCLE 19

222 Caspian Drive, Sunnyvale, CA 94086
Tel: (408) 744-0810 • TWX: 910-339-9297 "See us at NCC Booth W6248"

RACAL

saying," he explains. "When I wanted it to say, 'You are here,' I had to make this understandable to the computer by programming in 'U' rather than 'You.' I had to play with it and experiment with it."

Has the program helped Kevin? "Oh yes," says Myers. "His papers are coming back with 100 percent [correct answers] now. His grades have improved. There's got to be a correlation somewhere."

Kevin's older brother Michael also wanted to use the computer for his school work. Five years ago when Michael was in the seventh grade, he asked his dad for a TRS-80. Dad decided to strike up a bargain. "If he could teach himself BASIC, I would buy him a computer," says Myers.

Using the Honeywell computer system at school, Michael soon learned the new language. And his father kept his promise. With a TRS-80 to practice on, Michael quickly became an expert and began to lecture students at a nearby high school on computer applications.

Not wanting to leave Michael out of his programming endeavors, Myers developed a special word-processing program for his older son, just as he had developed a math program for Kevin. Part of the reason Myers developed

the program is because Michael, now a 17-year-old junior at Brophy College Preparatory School and a member of the school swim team, didn't have a lot of time to devote to typing reports for school.

So, when Myers designed the word-processing program, written in Assembler and FORTRAN, he kept the entire swim team in mind. "I wanted to emulate a typewriter but still include the facilities for searching and correction," he says, "and make it as easy as possible."

"First I wrote down what the young men wanted as far as writing their papers was concerned," explains Myers. Keeping this information in mind, Myers wrote out some instructions for the text editor. By typing the word "help" there is an immediate choice for a short or long list of instructions. Myers feels that this makes the information more accessible to the students than if they had to constantly refer to a manual.

Consequently, the Myers household has become a popular teenage hangout. "They'll play pool while one of them writes his report," laughs Myers, "which comes out letter perfect." And that's not surprising. Not only did Myers create a word-processing program, but a spelling checker as well.

Computer Tabulates Marathon Results In Record Time

Brian Leffler was supposed to be at the finish line of last year's American Ski Marathon VI, a major cross-country event held in Vermont. Leffler was asked by race officials to tabulate the results of the race on his North Star Advantage personal computer. But with weather conditions being as volatile as they are in the north country, this just wasn't possible. Poor snow conditions forced a last-minute rerouting of the race course, which meant that the last leg of the race was skied at Bread Loaf, near Middlebury, and not at Brandon as scheduled.

In the wee hours of the morning before the 1982 marathon, race director Tony Clark called Leffler, telling him of the routing change. He asked him if he'd still be able to tabulate the race results on his computer, since he'd be away from the race site. Leffler jumped at the chance to use his Advantage in a new way—but first he had to write a program for this application.

With the race only hours away, Leffler went to work. One and one-half hours later the program was ready. He entered the data Clark had accumulated on the more than

700 registered entrants, including the name, address, bib number, and age class of each racer. Then, as the results came in at the Bread Loaf finish line, they were read to Leffler over the telephone. Within minutes after the last racer crossed the finish line, the results were tabulated—a saving of three to four hours over previous marathon finishes.

The next time Leffler participates in this event, he has promised himself that he will definitely be at the finish line, no matter what happens. The data and results of that American Ski Marathon will be collected and tabulated on Leffler's Epson HX 20 portable computer, which includes a built-in printer.

All of the registrants' data will be entered prior to the day of the marathon. And as each skier completes the race course, an electronic eye will catch the individual finish times as each racer breaks the beam. Almost instantly Leffler will have the results not only tabulated by the HX 20, but printed out by class. According to Leffler, "It's not a complicated program."

Give us a call and it's on its way.

Our inventory is so huge, we've probably got just what you want in stock. We'll ship it out right now. At the right price.

16K RAM KITS.....13.95

Set of 8 NEC 4116 200 ns. Guaranteed one year.
FOR IBM-PC, set of 9.....15.75

DISKETTES

ALPHA DISKS.....21.95

Single sided, certified Double Density 40 Tracks, with Hub-ring. Box of 10. Guaranteed one year.

SCOTCH 3M

S.S.D.DEN 40 TRK.....23.50
D.S.D.DEN 40 TRK.....36.50

VERBATIM DATALIFE

MD 525-01, 10, 16.....26.50
MD 550-01, 10, 16.....44.50

DISKETTE STORAGE

5 1/4" PLASTIC LIBRARY CASE.....2.50
PLASTIC STORAGE BINDER w/ Inserts.....9.95
PROTECTOR 5 1/4" (50 Disk Capacity).....21.95
DISK BANK 5 1/4".....5.95

ATARI

See Apple & Atari Software.

ATARI 800.....\$CALL
ATARI 400 (16K).....\$CALL
ATARI 810 DISK DRIVE.....44.50
ATARI 850 INTERFACE.....169.00
GALAXIAN.....32.00
DEFENDER.....32.00
CENTIPEDE.....32.00
TAX ADVANTAGE.....38.97
FILE MANAGER 800.....79.16
VISICALC.....189.00
HOME ACCOUNTANT.....59.97

INTEC PERIPHERALS RAM MODULES

48K FOR ATARI 400.....145.00
32K FOR ATARI 800.....67.00

PRINTERS

STAR MICRONICS GEMINI 10.....\$CALL
RIBBONS FOR MX-80.....8.95
RIBBONS FOR MX-100.....24.00
C-ITOH F-10 40 CPS PARALLEL.....1390.00
C-ITOH F-10 55 CPS PARALLEL.....1639.00
C-ITOH PROWRITER PARALLEL.....410.00
EPSON MX-80 W/GRAFRAX PLUS.....\$CALL
NEW! EPSON FX-80.....\$CALL
EPSON MX-100 W/GRAFRAX PLUS.....\$CALL
EPSON GRAFRAX PLUS.....60.00
COMREX CR-1 PARALLEL.....839.00
NEC 8023A.....485.00
MICROBUFFER IN-LINE 32K.....299.00
MICROBUFFER IN-LINE 64K.....349.00
MICROBUFFER 64K EXPANSION MOD.....179.00

APPLE HARDWARE

QUENTIN APPLEDATE DRIVE.....269.00
SOFTCARD PREMIUM SYSTEM.....517.00
MICROSOFT Z-80 SOFTCARD.....249.00
MICROSOFT RAMCARD.....79.00
VIDEX 80x24 VIDEO CARD.....260.00
VIDEX KEYBOARD ENHANCER II.....129.00
VIDEX FUNCTION STRIP.....74.00
M & R UNIVERSAL MOD.....54.95
T/G JOYSTICK.....44.95
T/G PADDLE.....29.95
T/G SELECT-A-PORT.....54.95
T/G TRACKBALL.....47.50
KRAFT JOYSTICK.....48.00
VERSA E-Z PORT.....21.95
PROMETHEUS VERSACARD.....165.00
MICROBUFFER II 16K W/GRAPHICS.....259.00
MICROBUFFER II 32K W/GRAPHICS.....299.00
SUPERFAN II.....62.00
SUPERFAN II W/ZENER.....84.50
RANA CONTROLLER.....104.00
RANA DRIVE ELITE I.....335.00
GRAPPLER+.....145.00
7710A ASYNCHRON. SER. INTERFACE.....149.00
VISTA VISION 80-80 COL CARD.....259.00

CPS MULTIFUNCTION BOARD.....154.00
RAMPLUS 32K.....160.00

MONITORS

USI AMBER 12".....160.00
NEC 12" GREEN MONITOR.....169.00
BMC GREEN MONITOR.....89.00
TAXAN 12" AMBER.....125.00

MODEMS

NOVATION J-CAT.....125.00
NOVATION SMARTCAT.....209.00
NOVATION APPLE-CAT (300 Baud).....310.00
NOVATION APPLE-CAT (1200 Baud).....605.00
HAYES MICROMODEM II.....289.00
MICROMODEM W/ TERMINAL PKG.....309.00
HAYES SMART MODEM (300 Baud).....227.00
HAYES SMART MODEM (1200 Baud).....540.00
SIGNALMAN MODEM W/RS-232C.....85.00

IBM HARDWARE

SEATTLE 64K RAM +.....355.00
QUADBOARD 64K.....430.00
64K MEMORY UPGRADE.....80.00
APPARAT COMBO BOARD.....175.00

ALPHA BYTE IBM MEMORY EXPANSION BOARDS

256K W/RS-232C.....349.00
256K W/RS-232C & SUPERCALC.....529.00
512K W/RS-232C.....579.00
512K W/RS-232C & SUPERCALC.....749.00

IBM DISK DRIVES

Alpha Byte's add-on drive kits for the IBM-PC — each kit includes installation instructions.
Tandon TM100-1 Single head 40 trk.....195.00
Tandon TM100-2 Double head 40 trk.....262.50

BARE DRIVES

TANDON 5 1/4 INCH
100-1 SINGLE HEAD 40 TRK.....195.00
100-2 DUAL HEAD 40 TRK.....262.50
100-3 SINGLE HEAD 80 TRK.....250.00
100-4 DUAL HEAD 80 TRK.....369.00

MICRO PRO

APPLE, IBM & CP/M

WORDSTAR*†.....279.00
SUPERSORT*†.....179.00
MAILMERGE*†.....174.00
DATASTAR*†.....207.00
SPELLSTAR*†.....174.00
CALCSTAR*†.....109.00

MICROSOFT

APPLE

TYPING TUTOR II.....17.95
TASC APPLESOFT COMPILER.....125.00
ALDS.....95.00
MULTIPLAN NATIVE OR CP/M.....209.00

IBM SOFTWARE

MULTIPLAN.....209.00
HOWARD SOFT TAX PREP.....209.00
VOLKSWRITER V 1.2.....145.00
WRITE ON.....90.00
EASYWRITER II.....247.00
HOME ACCOUNTANT+.....105.00
FIRST CLASS MAIL.....85.00
SUPERCALC.....179.00
d BASE II.....429.00
THE WORD PLUS.....117.00
T.I.M.....379.00
JFORMAT.....39.00
VISICALC / 256K.....189.00
VISITREND / VISIPILOT.....235.00
VISIDEX.....192.00
VISIFILE.....249.00
VISISCHEDULE.....229.00
WIZARDRY.....46.76

ZORK I, II, III.....28.00
STARCROSS.....28.00
DEADLINE.....35.00
THE WARP FACTOR.....31.16
LOST COLONY.....23.36
APPLE PANIC.....23.61
TEMPLE OF ASPHALT.....34.95
CROSSFIRE.....24.95
FROGGER.....27.26
M SOFT FLIGHT SIMULATOR.....38.95

If you don't see the software you want, call. Our software stock is constantly expanding.

APPLE SOFTWARE

DB MASTER.....169.00
DB MASTER UTILITY PACK I OR II.....69.00
PFS: GRAPH.....89.95
PFS: (NEW) PERSONAL FILING SYSTEM.....85.00
PFS: REPORT.....79.00
Z-TERM PRO*.....129.95
ASCII EXPRESS PRO.....98.00
BEAGLE BROTHERS UTILITY CITY.....23.00
APPLE MECHANIC.....23.00
TIP DESK #1.....15.95
BEAGLE BAG.....23.00
SUPER TEXT HOME OFFICE.....97.50
LISA 2.5.....59.95
TRANSCEND II.....115.00
SCREENWRITER II.....99.00
DICTIONARY.....79.00

CONTINENTAL SOFTWARE

ACCOUNTING SOFTWARE, EACH.....165.00
THE HOME ACCOUNTANT.....59.95
F.C.M. w/form letter.....75.00
TAX ADVANTAGE.....45.00

VISICORP

VISITREND/VISIPILOT.....229.00
VISIDEX.....189.00
VISITERM.....79.00
VISICALC.....189.00
VISIFILES.....189.00
VISISCHEDULE.....229.00

CP/M® SOFTWARE

We carry CP/M® software in all popular disk formats. Call for availability and price. Most software also available on IBM.

THE WORD PLUS.....117.00
d BASE II.....429.00
QUICKCODE.....230.00
DUTIL.....91.00
SUPERCALC.....189.00

MICROSOFT

MULTIPLAN.....209.00
BASIC 80.....249.00
BASIC COMPILER.....299.00
COBOL 80.....585.00

GAMES

APPLE & ATARI GAMES

ZAXXON.....31.16
MICROPAINTER.....27.35
APPLE PANIC.....23.61
MIDNIGHT MAGIC.....27.26
CHOPFLIFTER.....27.20
STAR WARRIOR.....31.35
CRUSH, CRUMBLE AND CHOMP.....24.95
TEMPLE OF ASPHALT.....31.35
WIZARD AND PRINCESS.....27.26
SOFT PORN ADVENTURE.....23.36
THRESHOLD.....31.16
JAW BREAKER.....23.36
CROSSFIRE.....24.95
ULYSSES & GOLDEN FLEECE.....25.95
FROGGER.....24.50
ZORK I, II, III.....28.00
STARCROSS.....28.00
DEADLINE.....35.00

MORE GREAT APPLE GAMES

DARK CRYSTAL.....31.61
TUBEWAY.....27.26

ARCADE MACHINE.....44.38
THE SPACE VIKINGS.....38.50
ULTIMA.....31.16
FLIGHT SIMULATOR.....26.61
A.E.....23.72
PINBALL SUBLOGIC.....24.50
BUDGEO PINBALL CONST. SET.....31.61
WIZARDRY.....37.95
ULTIMA II.....42.00
LUNAR LEEPER.....23.36

To order or for
information call

In Chicago:
(312) 454-1236

In New York:
(212) 509-1923

In Los Angeles:
(213) 706-0333

In Dallas:
(214) 744-4251

By Modem:
(213) 991-1604

CALL OUR MODEM LINE
FOR WEEKLY SPECIALS.

Alpha Byte® COMPUTER PRODUCTS

31245 LA BAYA DRIVE
WESTLAKE VILLAGE, CA 91362

CIRCLE 20

Satisfaction Assurance — Your satisfaction is assured by our 30 day moneyback guarantee on all hardware products we sell. No refunds after 30 days. All manufacturers' warranties are supported. Defective software will be replaced free during the first 30 days, however, no refunds or exchanges on software. Proof of purchase required. All returns must be authorized in advance. **How To Order** — All orders must be paid prior to shipment. Order by phone or by mail. Use Visa, M/C, check or COD. COD limit \$300. Shipping charges: Visa, M/C orders = actual shipping costs. Prepaid orders add \$3 (under 25lbs.) or \$6 (over 25lbs.) COD's use prepaid rates and add \$4 surcharge. Foreign, FPO and APO orders add 15% of order total. Calif. orders add 6% sales tax. L.A. County add 6 1/2% sales tax. Prices quoted are subject to product availability and may change without notice.

CP/M is a reg. trademark of Digital Research.

*Requires Z-80 Softcard.

†Reg. trademark of Micro Pro International Corp.

‡Trademark of Practical Peripherals, Inc.

**Trademark of Software Dimensions, Inc.

It might not sound like a complicated program if you're a professional programmer, but Brian Leffler is a 16-year-old high school student who thinks "computers are the greatest invention since peanut butter."

His fascination with computing began four years ago when, after reading about personal computers in several magazines given to him by friends, he decided he wanted to own one. This meant saving money.

Leffler worked after school at his parents' general store in Leicester, Vt. until he had saved enough money to buy his own machine. Anticipating the purchase, he studied programming and other aspects of computing on his own. When he finally bought a Texas Instruments TI 99/4, he was ready to use it.

His interest and knowledge grew as he used his new system. He learned Pascal, BASIC, COBOL, C, FORTRAN, Assembler—by himself—reading volumes about computing, including books on advanced programming. "Currently, I'm working on a couple of commercial software products," he explains, "a multiuser operating system and a good accounting package."

For the past year Leffler has been involved in yet another computer project—Leffler's Computers—his own retail computing business in Brandon. His basement store/showroom was constructed with the help of his father, Frank. The store provides the potential buyer with a single source for hardware, software, and consulting.

"The average sale," says Leffler, "runs about \$7000."

Currently, Leffler's Computers handles about 21 brands of computer merchandise—too many for Leffler to manage in the basement of his parents' house. He's looking to expand his selling space, with the increasing business. "I think my business will continue to grow," he says. "With the price of computers at the current reasonable levels, I can't think of a small business that cannot afford to have one, taking into consideration the amount of time it saves."

One of Leffler's first business clients was the First Brandon National Bank. The bank was so satisfied with its computer system and with the service and "know-how" Leffler provided, that it has become one of Leffler's continuing sources of business advice and a recommendation source for potential customers.

And that's not all that makes this young man run—he's now writing a newsletter for a local computer group. "It's great fun," says Leffler. Writing a newsletter is one thing, but writing new users' manuals to go along with the computers and software packages that he sells is another. "Sometimes," he notes, "the documentation is so poor that I have to rewrite it for my customers."

But computers aren't the only things in Leffler's life. "I like to spend my free time away from computers. I get to use them so much anyway," he says. "I'm still a normal kid who's just very, very busy."

Keeping A Finger On The Pulse Of The Organization

Members of the National Association of Farm Broadcasters are a vital source of information for the farming community. Over the airwaves the broadcasters report farm news, market information, and weather—anything that might have an effect on the agricultural economy. Farmers see the radio reports as an essential link to their peers and to important data. In the same way, broadcasters feel that the NAFB offers them a chance to share information with their peers.

But the NAFB has 700 members scattered across the nation so keeping abreast of goings on inside the organization is a formidable task. And as executive secretary of the NAFB, George Logan is the person assigned to keep the NAFB running smoothly. He does this with the aid of an Apple II personal computer and PFS electronic filing system software.

Logan's job as executive secretary includes keeping membership rosters, address lists, dues received and owed, and general membership information. He invested in the Apple II in December of 1981 in order to keep his "fingers on all information about the members at a moment's notice."

Logan, who has been involved with the NAFB since 1957 and executive secretary since 1973 as well as the general manager of radio/television station WIBW in Topeka, Kansas, has lately had few problems keeping up with the additional work load. He credits the purchase of his computer for this. Using the Apple along with two disk drives, an Epson MX-100 dot-matrix printer, and the PFS software, Logan has computerized all the membership updates, dues collections, and address changes.

"Our record keeping system before last January can

PRESENTING THE REMARKABLE SV-318.



© 1983 Spectra Video, Inc.

THE PERSONAL COMPUTER YOU'LL GROW INTO, NOT OUT OF.

SPECTRAVIDEO SV-318 COMPUTER COMPARISON CHART						
	SPECTRAVIDEO SV-318	APPLE II PLUS	ATARI 800	COMMODORE 64	NEC 6001	RADIO SHACK COLOR COMPUTER
BASE PRICE	\$299	\$1,540	\$899	\$595	\$399	\$299
COMPUTING POWER FEATURES						
BUILT-IN ROM	32K	12K	10K	20K	16K	8K
EXPANDABLE TO	96K	N/A	42K	N/A	32K	16K
BUILT-IN EXTENDED MICROSOFT® BASIC	YES	YES	YES	YES	YES	YES
BUILT-IN RAM	32K*	48K	16K	64K	16K	4K
EXPANDABLE TO	144K**	64K	48K	N/A	32K	16K
KEYBOARD FEATURES						
NUMBER OF KEYS	71	51	61	66	71	55
USER DEFINE FUNCTIONS	10	N/A	4	8	10	NONE
SPECIAL WORD PROCESSING	YES	NO	NO	NO	NO	NO
GENERATED GRAPHICS (FROM KEYBOARD)	YES	NO	YES	YES	NO	NO
UPPER/LOWER CASE	YES	UPPER ONLY	YES	YES	YES	YES
GAME/AUDIO FEATURES						
SEPARATE CARTRIDGE SLOTS	YES	NO	YES	NO	NO	NO
BUILT-IN JOYSTICK	YES	NO	NO	NO	NO	NO
COLORS	16	15	128	16	9	9
RESOLUTION (PIXELS)	256 x 192	280 x 160	320 x 192	320 x 200	256 x 192	128 x 64
SPRITES	32	N/A	4	8	N/A	N/A
SOUND CHANNELS	3	1	4	3	3	1
OCTAVES PER CHANNEL	8	4	4	9	8	10
A.D.S.R. ENVELOPE	YES	NO	NO	YES	YES	NO
PERIPHERAL SPECIFICATIONS						
CASSETTE	2 CHANNEL	1 CHANNEL	2 CHANNEL	1 CHANNEL	1 CHANNEL	1 CHANNEL
AUDIO I/O	YES	NO	YES	NO	NO	NO
BUILT-IN MIC	YES	NO	YES	NO	NO	NO
DISK DRIVE CAPACITY (LOW PROFILE)	256K	143K	96K	170K	N/A	170K
CP/M® COMPATIBILITY (80 column programs)	YES	NO***	NO	NO****	NO	NO
CP/M® 2.2	YES	NO	NO	NO	NO	NO
CP/M® 3.0	YES	NO	NO	NO	NO	NO

* 16K user addressable plus 16K graphic support

** 128K user addressable plus 16K graphic support

*** Apple II can accept modified 40 or 80 column CP/M

**** Commodore 64 accepts 40 column CP/M

Microsoft is a registered trademark of Microsoft Corporation
CP/M is a trademark of Digital Research, Inc.

Sadly, many personal computers will become tomorrow's junk in the attic. The SV-318 is one that will not. Because as you get better, it gets better. It does so because of its capability and expandability—both far beyond those of any other affordable computer.

CAPABILITY. The SV-318 isn't just more capable. It's much more capable. No other computer at even twice the price combines all these extraordinary features: 32K ROM expandable to 96K; 32K RAM expandable to 144K; Extended Microsoft Basic (the industry standard); even Standard CP/M 80-column capability so you can immediately utilize over 10,000 existing software programs. The SV-318 also has a unique built-in joystick/cursor control—an immeasurably useful feature when it comes to playing your favorite video game.

EXPANDABILITY. As you become more and more skillful with computers, you'll love how the SV-318 "stretches" to meet your demands (and actually leads you in fascinating, new directions). For one thing, all eleven of our important peripherals are available immediately. With most other models, you have to wait months. For another, the SV-318 is beautifully designed to interface with new options as they become available.

AFFORDABILITY. The SV-318 is not only eminently affordable, it's the first true bargain of the computer age! Besides home budgeting, business applications, word processing, programming and self-teaching, the SV-318 is the best entertainment value in town. Not only can you use it with your TV to play hundreds of different video games, you can also use your SV-318 with a TV as a drawing tablet or music synthesizer. In play, as in work, the SV-318 will continually expand to meet your potential.

Whether you're just wetting your toes in computers, or fully afloat on the waters, the SV-318 is a computer that will serve you for many, many years. You see, we believe that even in the computer age, you don't become an object of real value unless you're around for a while.

FOR UNDER \$300

SPECTRAVIDEO
SV-318
PERSONAL COMPUTER

SPECTRA VIDEO, INC., 39 W. 37th St., N.Y., N.Y. 10018

CIRCLE 21

best be described as no system at all," he says. "Files were scattered all over our regional offices. Trying to maintain accurate records was hopeless."

Further updating information on an organization of 700 members was no easy feat, adds Logan. Before he made the move to computerization, the data about each member was kept on a card file. "The work involved when any member moved or changed jobs was incredible," he says. "There was almost no way to do it except to sit down and retype the list."

The card files, the applications, the job-history files, the never ending flow of paper, has all been transferred to disk. And the new files list individuals alphabetically and regionally and include the date they joined or when they applied for membership.

According to Logan, one of the real joys of the Apple purchase is the speed in which he now produces reports on members. "Since January I've been sending out monthly reports to our regional and national officers showing the status of all members and pending members," he says.

"We really didn't do that at all on a regular basis before." Previously it was up to each regional vice president to maintain records. "Now they've ceased this maintenance of their own records, and we keep everything stored on the disks and send them monthly updates."

Another one of Logan's tasks as executive secretary is mailing out newsletters and meeting reports to NAFB members. And the computer system has proven more than ample for this job as well. Logan finds it much easier to produce the mailing lists, and organize them, even fitting the needs of the post office in the process because PFS will sort the list by ZIP codes.

Besides keeping records of dues, addresses, membership dates, and job history, Logan plans to begin tracking attendance at meetings.

Overall, despite some early difficulties in learning how the computer worked, Logan is now a disciple of the system's virtues. "It has lessened the burden of paperwork and we now turn out dozens of reports that we just couldn't do manually."

Hand-Held Computers Aid Pilots With Flight Planning

When Orville and Wilbur Wright first sputtered into the skies on that historic day in 1903 at Kitty Hawk, North Carolina, they didn't have a personal computer on board to help them decide how much fuel they needed to fly their plane. And when Charles Lindbergh flew the Spirit of St. Louis across the Atlantic in 1927, he didn't have a personal computer to help him decide what his flight plan would be. But if a computer had been available to these aviation innovators, they probably would have thought it was a good tool to have in their cockpits—right beside their screwdrivers.

Soaring through the clouds with an Apple II or an IBM Personal Computer as your co-pilot, however, would indeed be a difficult task. But Tommy LittleJohn, a pilot and flight instructor who teaches the flying of Piper Cheyennes for Flight Safety International of Lakeland, Fla., was determined. He wanted a computer in his cockpit, and now he has one—a TRS-80 Pocket Computer that one of his students introduced him to about two years ago.

A week after seeing the pocket computer for the first time, LittleJohn went to the store and purchased one for himself. "I bought absolutely nothing but the instruction

manual," he says. "I said to myself, 'I'm just gonna go after this sucker [by] trial and error!'"

And go after it he did. LittleJohn created a program for the TRS-80 pocket computer (now the TRS-80 PC 1) which provides a flight plan for pilots of Piper Cheyennes. These turboprop planes have jet engines with propellers and seat from four to 11 people. "They're basically owned by corporations who don't want to hassle with the commercial airlines and who can afford this luxury," says LittleJohn. "They're corporate aircraft used for moving executives from A to B."

The final program, which LittleJohn developed in a little more than a week, is "a very quick and practical way for the pilot to find out whether or not he can carry all the people the boss wants him to carry, and go as far as the boss wants him to go," says LittleJohn. "And all of this is possible with something that fits in your back pocket!"

LittleJohn's program provides the necessary information for a pilot to compile a flight plan. First, he enters the weights of both passengers and baggage. Following this input, the weight of the aircraft including its load will appear on the pocket computer's screen. If the pilot has exceeded weight limitations he'll hear a beep. If not, he

This man uses the Data Factory.



The DATA FACTORY . . . will free you up, at the office or at home, *to do more important things*. The DATA FACTORY's sophisticated design allows you to save your information and make reports from your computer more easily, conveniently, reliably and flexibly. The DATA FACTORY's custom feature allows you to set up inputs and outputs any way or in any form you desire. Available in floppy disc or hard disc configurations on the Apple™, IBM™, Olivetti™ and CP/M™ systems.

Let the DATA FACTORY, the great time-saver from MicroLab, start simplifying your life, today.



CIRCLE 85

Apple is a registered trademark of Apple Computer, Inc.
IBM is a registered trademark of International Business
Machines Corporation.

Olivetti is a registered trademark of Docutel/Olivetti Corporation
CP/M is a registered trademark of Digital Research, Inc.

can then punch in the number of pounds of fuel on board. Again the computer will respond if legal weight limitations are exceeded. If the load is overweight, "the pilot has the choice of either throwing a couple of guys off or reducing the fuel," says LittleJohn.

The program also helps the pilot with other aspects of flying the plane—gravity limitations, the longitude and latitude of his destination, the distance of his trip, wind velocity and direction, air speed, fuel flow per hour, the amount of fuel he has burned, and the airplane's final landing weight.

Although all of the pilots that LittleJohn teaches know how to fly a plane before they get to him, every plane is different. So using the computer gives them an advantage because the program knows the plane's limitations. And the program can be customized to whatever plane the pilot is flying.

LittleJohn says that people react with "a lot of amazement" the first time they see the program. A common reaction is for people to regard him as some type of

genius, but he adamantly refuses the title. And he cannot understand what the big deal is all about. "I'm befuddled that anybody's interested in this program because I think anybody could do this," he says.

"A lot of people write and tell me that they want me to send the cassette (programs and data for the pocket computer are stored on audio cassette tapes) and I write back and tell them no, they can figure it out for themselves." And, says LittleJohn, "They call me back and say, 'You're right. I thought you were some smart guy but I figured it all out by myself.'"

Much of the program's simplicity, however, should be credited to LittleJohn. "I wanted to make it user friendly," he says. "You just press a button, answer the questions, and you find out the information you want."

"The thing that kills me," says LittleJohn, "is that they all thought they couldn't do it." But they do it everyday. It's the same knowledge they use constantly as pilots and "the same equations they write down every day on little pieces of paper."

Giving Business Growth A Computerized Push

Keeping a business healthy is much like keeping a body healthy—you have to work at it. When you work out, you carefully choose particular exercises to firm up certain parts of your body. When you want to strengthen your business, you similarly learn, and choose, which facts and figures will help you reach your goal. By using an IBM Personal Computer to keep track of such customer trends as the demographic information of current members, the staff of the Nautilus Fitness Centers in the Washington, D.C. area can now keep their business as healthy as their members.

"With the computer we're able to accomplish in a few minutes what used to take hours," says Jeff Neuburg, president of the Centers. "Most important, we can now keep records we couldn't keep before because they required too many man-hours to maintain."

The staff at Nautilus has used the computer and custom-designed data-base management software to compile information about members who have joined the centers over the past five years. Examining the information, Neuburg has learned members' average ages, incomes, and terms of membership.

From these data, an interesting statistic popped up.

Neuburg learned that the number of women joining his centers had steadily increased. "We found that five years ago, women made up only about 20 percent of our total membership," he says. "And today, the number of women members is nearly equal to men." Neuburg can use this information to tailor some of his advertising to the female segment of the population.

The demographic data Neuburg has collected also helps him determine what forms of advertising would be most effective in reaching his specific audience. Knowing the average age of the people who are currently joining the centers allows him to place radio spots on appropriate stations. For example, if he wants to reach people in the 40- to 50-year-old age group, he can choose a station whose listeners fall into that demographic category. "Now, we can tailor our advertising and measure the results," he says.

Another use for the computer is to compile information from a recruitment card made available to potential members throughout the Washington area. Using information from the cards, Neuburg's staff can send out brochures and letters.

(continued on page 48)

How to get the best out of (and into) your computer.

You've invested in your computer to get data accurately, intelligibly. The modem is no place to compromise and slip in a weak link.

With Novation Cat[®] modems you don't. Our Cat line is a full one. At one end—our small, handy J-Cat. It purrs along at 300 bps, excellent for home use. At the other end, with all the features and conveniences you want for business—our full blown smart, automatic communication systems that can roar along at 1200 bps.

All have one thing in common—unique, highly advanced LSI chips. Our engineers have designed these little marvels, eliminating

the complexity and costs of typical modems, and producing instead modems elegantly simple in execution with absolutely state-of-the-art reliability and features.

There's nothing quite like working with the latest and the best. Come see.

The Cats are at leading computer stores.

There's another good reason to buy right now.

Tucked inside every Cat package, you'll now see a special "get acquainted" subscription to **The SourceSM**. You might as well get started right.

J-CATTM MODEM

It's smaller. 1/5th the size of an ordinary modem. Easy to stick-on, tuck-in, put anywhere you want. Auto-answer. Also, no fussing to get into the right mode, answer or originate—J-Cat does it automatically. \$149*



103 AND 103/212 SMART-CAT™ MODEMS

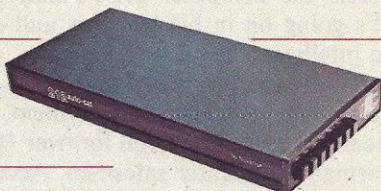


They do more, do it easier and do it in less space. And with LSI technology they run better and cooler—and will for years. Built-in dialer, redialing on busy signal, auto answer, plus extensive software command set.

103 Smart-Cat (300 BAUD, full duplex) \$249*

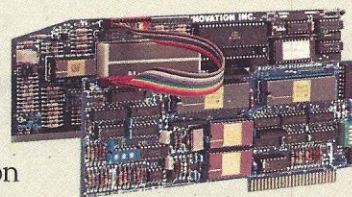
103/212 Smart-Cat (300 or 1200 BAUD full duplex) \$595*

212 AUTO-CAT™ MODEM



You get all the options of a full duplex Bell 212A compatible modem and more. It's an advanced modem with custom micro-processors and LSI circuits that have let us cut parts count and costs drastically—while improving performance in every way. Auto-answer and auto selection of 1200 bps or lower speed. Both synchronous and asynchronous. \$695*

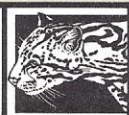
APPLE®CAT™ II WITH 212 OPTION



Complete communication system for Apple owners.

Modular design lets you grow into—not out of—the system. Comes with excellent software—our own Com-Ware™ is a simple-to-use, menu driven terminal program. Full range of speeds up to 1200 bps. All auto functions—phone directory with auto configuration and auto dial, redial, answer, disconnect. Binary or text modes. VisiCalc™ and CP/M™ compatibility—and the list is growing. Installation can still be just one slot in your Apple II, even with optional 212 card. \$389* and up.

Novation

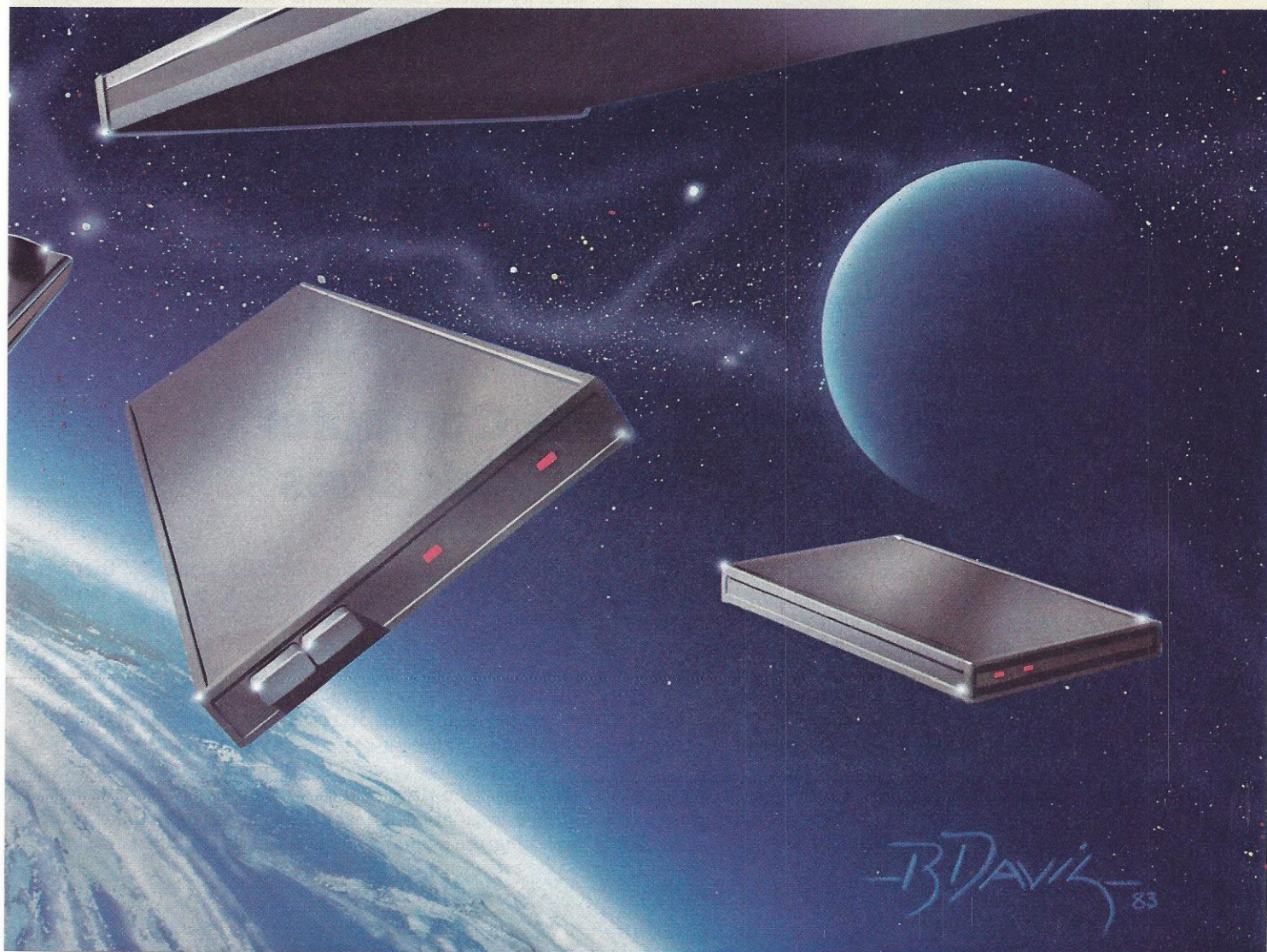


*The
recognized
leader in
personal
communications.*

Novation, Inc., 18664 Oxnard Street, Tarzana, CA 91356
(800) 423-5419 • In California: (213) 996-5060

Cat is a registered trademark of Novation. VisiCalc is a trademark of Personal Software, Inc. CP/M is a trademark of Digital Research Inc. Apple is a registered trademark of Apple Computer Inc. *Suggested retail

CIRCLE 63



(continued from page 45)

"It's a real asset to my business, especially for mailing lists," Neuburg says. "We do a mailing every month—mass mailings are 10,000 pieces and individual center lists run about 2000 pieces."

The information Neuburg gets from the cards helps



An IBM Personal Computer is helping a Nautilus Fitness Center shape up by keeping track of membership demographics.

with future business planning. "We find out where our people come from (ZIP code and city)," he says. "This helps us decide where we should open up another club." He feels the computer allows him to monitor exactly what's going on in his business and consequently make more intelligent business decisions.

Part of monitoring Neuburg's business involves bookkeeping—tracking the payment status of hundreds of members and the payroll for over 100 people—and the performance of center salesmen. According to Neuburg, making sure all of these functions were done and done right "was getting to be a nightmare." So he put the computer to work. "Without the computer we couldn't keep track of what was going on where. It's hard to do it by hand." But with the computer, Neuburg can track how many memberships each of his salesmen is selling at any given time. And monthly reports show what percentage of sales calls result in actual membership sales.

Plans for the future include adding programs that could directly benefit members. One would measure a person's strength, flexibility, body fat and oxygen intake, and determine a "fitness score".

Another program Neuburg plans to implement will measure a person's nutritional requirements and determine whether he is getting too many fats or too few vitamins. The member will keep track of all the food he eats over a 5-day period. That data will be input and analyzed to show the nutritional values of what the person is eating, what he should have, and how to get it. "It's basically nutrition, not exercise," says Neuburg. "We can give clients tests and input results as a means of comparison with the rest of the population."

Pharmacist Finds Computer Cure For Paperwork Blues

The growing cost of administering third-party payments to insurance companies and government agencies was strangling Alan Bierman's business. Bierman, owner of Valu-Med Pharmacy in Santee, Calif., found himself burdened by the regulations and paperwork of 150 different plans. He was beginning to be a full-time paper pusher and a part-time druggist. Bierman decided more help was needed if he was to meet the insurance company requirements so he installed a computer system developed by Pacific Pharmacy Computers of San Diego, one built around an Altos ACS8000 personal computer.

To illustrate the complications involved when third-

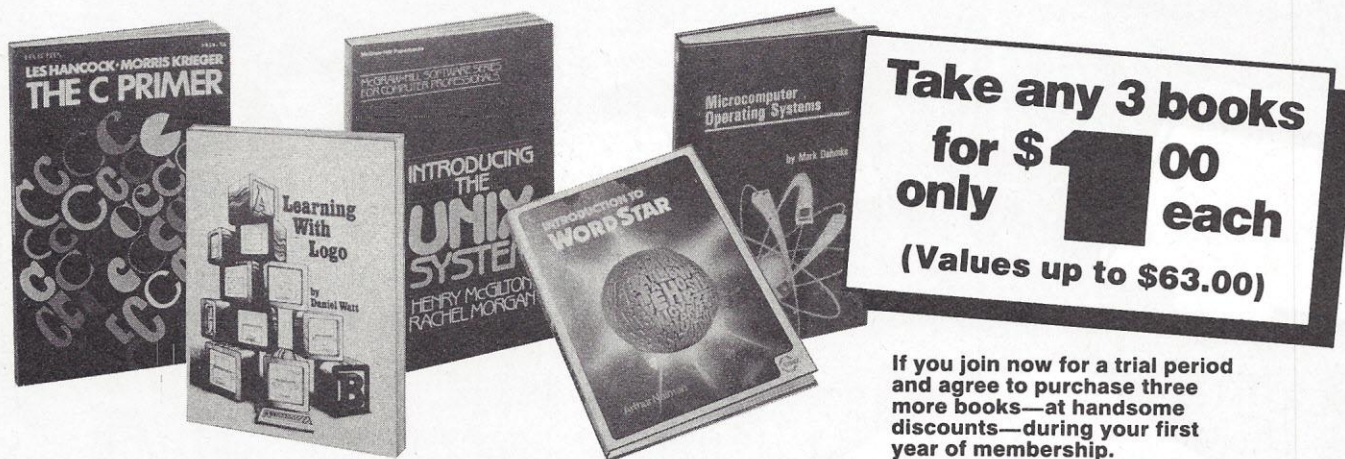
party medical payments are handled manually, Bierman explains: "Say a customer walks in, insurance card in hand, with a prescription for Apresoline (a blood-pressure medication). First we look through the appropriate book to determine whether his insurer would, in fact, pay for the drug, and if so, then in what quantity. His doctor might have suggested 500 pills, but we may be authorized to fill only a three-a-day, 34-day supply.

"We then look to see if the drug appeared on an exceptions list permitting us to offer it only in its generic form, and peruse a price list, which we agreed to honor before handling the plan." Bierman adds that that is a simple

Introducing...the Byte Book Club

FORMERLY COMPUTER PROFESSIONALS' BOOK CLUB

POWERFUL TOOLS! POWERFUL SAVINGS!



HOW TO BUILD YOUR OWN WORKING MICROCOMPUTER

By C. Adams
582267-9 \$16.95

AN INTRODUCTION TO VISICALC® MATRIXING FOR APPLE® AND IBM®

By H. Anbarlian
016/054 \$22.95

BUILD YOUR OWN Z-80 COMPUTER—and Z80 USERS MANUAL

By S. Ciarcia & J. Carr
582337-3B \$29.90
(Counts as 2 of your 3 books)

THE BUSINESS GUIDE TO SMALL COMPUTERS

By L. Calmus
096/627 \$19.95

BUSINESS INFORMATION PROCESSING WITH BASIC

By G. Struble
582360-8 \$17.95

BASIC: GETTING STARTED

By W. S. Davis
582355-1 \$5.95

THE C PRIMER

By L. Hancock
259/81X \$14.95

PROJECTS IN MACHINE INTELLIGENCE FOR YOUR HOME COMPUTER

By D. L. Heiserman
582574-0 \$17.95

APPLE PASCAL GAMES

By D. Hergert & J. T. Kalash
582521-X \$19.95

TRS-80 GRAPHICS FOR THE MODEL I AND MODEL III

By D. Kater & S. Thomas
333/033 \$12.95

MICROCOMPUTER GRAPHICS AND PROGRAMMING TECHNIQUES

By H. Katzan, Jr.
582576-7 \$18.95

INTRODUCTION TO WORDSTAR™

By A. Naiman
582594-5 \$21.95

PRINCIPLES OF INTERACTIVE COMPUTER GRAPHICS, 2/e

By W. M. Newman & R. F. Sproull
463/387B \$32.50
(Counts as 2 of your 3 books)

THE SMALL COMPUTER CONNECTION

By N. L. Shapiro
564/124 \$16.95

THE BASIC BOOK: A Cross-Referenced Guide to the BASIC Language

By H. Helms
279/594 \$7.95

WORD PROCESSING BUYER'S GUIDE

By A. Naiman
458/693 \$15.95

INTRODUCING THE UNIX SYSTEM

By H. McGilton
450/013 \$18.95

THE SOUL OF A NEW MACHINE

By T. Kidder
582439-6 \$13.95

APPLE PASCAL

By P. Luehrmann
491/712 \$16.95

MICROCOMPUTER OPERATING SYSTEMS

By M. Dahmke
150/710 \$15.95

PROGRAMMING WITH ADA: An Introduction by Means of Graduated Examples

By P. Wegner
789/24X \$17.95

HANDS-ON BASIC: For the IBM Personal Computer

By H. Peckham
491/78X \$22.95

LEARNING WITH LOGO

By D. Watt
685/703 \$14.95

Why YOU should join the Byte Book Club now!

- **Best and newest books from ALL publishers!** Books are selected from a wide range of publishers by expert editors and consultants to give you continuing access to the best and latest books in your field.
- **Big savings!** Build your library and save money too! Savings range up to 30% or more off publishers' list prices—usually 20% to 25%.
- **Bonus books!** You will immediately begin to participate in our Bonus Book Plan that allows you savings up to 80% off the publishers' prices of many professional and general interest books!
- **Convenience!** 14-16 times a year (about once every 3-4 weeks) you receive the Club Bulletin FREE. It fully describes the Main Selection

and alternate selections. A dated Reply Card is included. If you want the Main Selection, you simply do nothing—it will be shipped automatically. If you want an alternate selection—or no book at all—you simply indicate it on the Reply Card and return it by the date specified. You will have at least 10 days to decide. If, because of late delivery of the Bulletin you receive a Main Selection you do not want, you may return it for credit at the Club's expense.

As a Club member you agree only to the purchase of three additional books during your first year of membership. Membership may be discontinued by either you or the Club at any time after you have purchased the three additional books. Orders from outside the U.S. cannot be accepted.



Fill out the card and mail today! If the card is missing, write to:

BYTE BOOK CLUB, P.O. Box 582, Hightstown, New Jersey 08520



TI's new Compact Computer. It takes over your work, not your desk.

The ordinary personal computer occupies too much of the ordinary desk.

Now Texas Instruments brings you a cordless compact computer that solves the same sort of problems as the Apple™ or IBM™ personal computer. It has enough memory and power for complex problems in business and science, yet the whole thing is smaller than a magazine page.

Sophisticated software is available right now for finance, statistics, production planning, graphics—and spreadsheet and wordprocessing are just around the corner.

For most personal computer tasks, its 6K RAM and 34K ROM are ample. The system is easily, economically expanded.

The TI Compact Computer 40 has peripherals that make it even more useful:

a 4-color printer/plotter; an RS-232 interface for talking with other computers or running a larger printer; and TI Wafertape™ drive for program or data storage. TI Solid State Software™ cartridges offer you a choice of convenient, foolproof programs.

Its built-in language is TI Enhanced BASIC, which allows you to write programs in everyday words. The integrated liquid crystal display shows 31 characters, which can be scrolled to show up to 80 per line. It operates on four AA alkaline batteries that give up to 200 hours of service.

The TI Compact Computer 40 offers solutions anywhere you go. Yet it retails for less than 1/3* the price of Apple™ or IBM™ personal computers. The TI Compact Computer—compact in price and size, but not in power. See it soon at your Texas Instruments retailer.

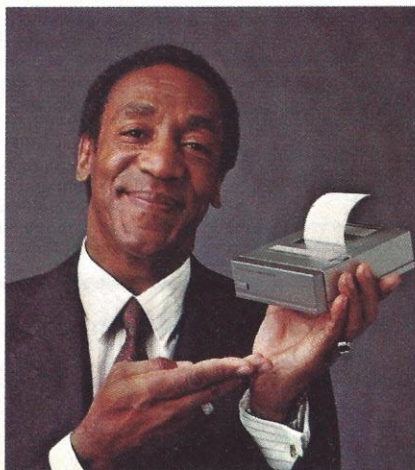
Creating useful products
and services for you.



TEXAS INSTRUMENTS

Copyright © 1983 Texas Instruments

CIRCLE 39



*Based on published manufacturer's suggested retail price.

Apple is a registered trademark of Apple Computer, Inc. IBM is a registered trademark of International Business Machines Corp.

example. At times abiding by an insurer's or the government's rules can mean grappling with hundreds of procedures.

"The state Medicaid program, for example, provides a list of drugs and prices that pharmacists can supply to those patients who are eligible," he says. "If you agree to honor the list, you must agree to their terms. And it's impossible to continually honor their terms without constantly monitoring their price lists.

"And after we've filled the prescription, we must type the appropriate form, submit it, and track the payment."

The computer has considerably simplified Valu-Med's operation, according to Bierman. To process an application now, pharmacy personnel simply type the drug's label on the computer terminal. The system confirms the names of the doctor and patient, provides the correct drug expiration date, performs all verifications, and stores the information for later billing. Because a universal claim form is acceptable to insurance companies the system can also type out billing forms directly.

Entering the applicable insurance and pharmaceutical information was easily accomplished using step-by-step prompting from the system. As Bierman notes, inputting was a one-time affair unlike the daily references to the manuals he once made.

"Information is only entered once because the forms are stored in memory," Bierman says. "These include Blue Cross, state programs, Workers' Compensation programs and other state and/or federal programs.

"The patient supplies us with all personal information but he wouldn't know the drug name, the doctor's code, the pricing, etc. In that way our system is a service to our customers."

In addition, the computer generates an end-of-day audit report giving him an overview of his business which assists Bierman in tracking day-to-day profits, checking inventory, and projecting the effects of changes in his pricing structure. And since the average pharmacy carries from 6000 to 7000 drugs, this can be a monumental task.

YOU SPENT \$4,000 ON A PERSONAL COMPUTER. FOR ANOTHER \$12.50, YOU CAN GET YOUR MONEY'S WORTH.

A lot of business people aren't realizing the full potential of their personal computers. Because they haven't realized how much more their computers are capable of.

LIST can help.

LIST is the first publication that puts software first. It contains articles by

some of the most respected names in the computer field. Written to help you get the most out of your personal computer.

What's more, *LIST* contains the *LIST Software Locator*,™ a

comprehensive guide to over 3,000 personal computer programs, conveniently indexed by application,



industry, operating system and hardware.

LIST is sold at leading computer stores and bookstores. Or, you can phone our toll-free number, and receive a copy by mail. The price, exclusive of postage and handling, is \$12.50, (VISA and MasterCard accepted).

Which is a pretty small price to pay for something that can maximize a much larger investment.

LIST is published by Redgate Publishing Company, an affiliate of E.F. Hutton.

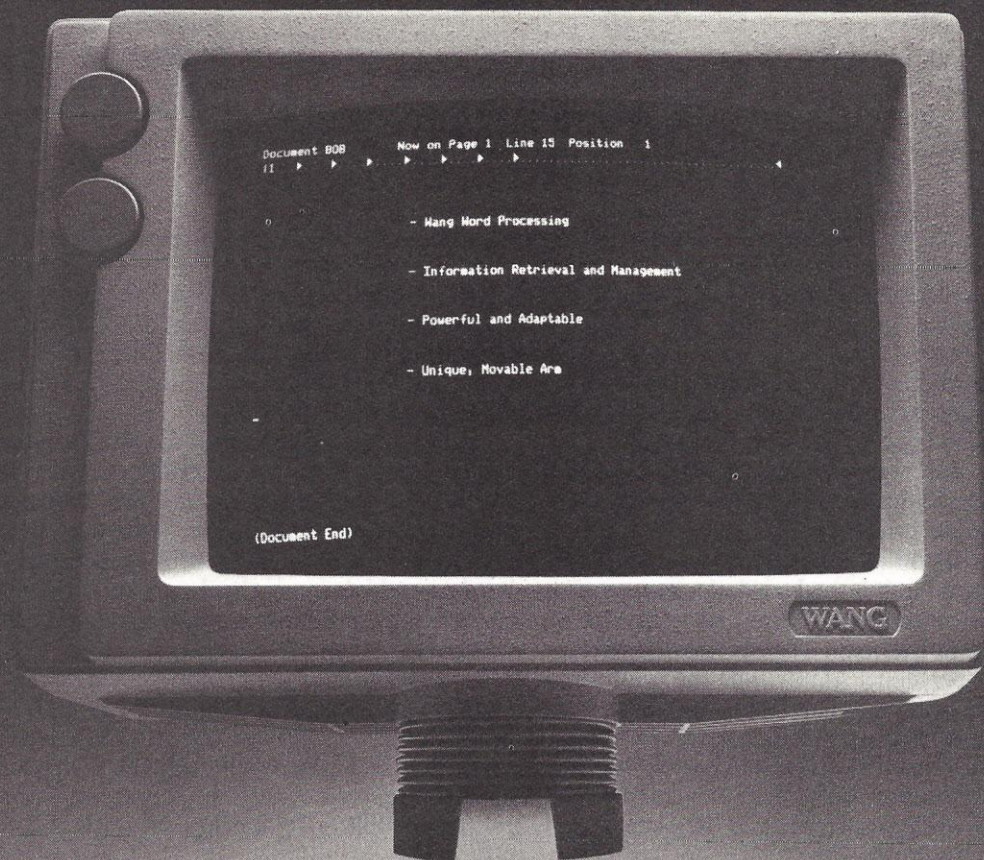


LIST™

The Software Resource Book For Personal Computer Users

1800 821-7700

Ext. 1110



Are you serious about buying a personal computer for your office? Or do you want to play games?

We started building computers and word processing systems for the office when most computer companies were still building computers for the backroom. And ever since, Wang has been the leader in office automation.

Now we've put all that experience to work, with the introduction of the Wang Professional Computer—a computer so advanced in capability and de-

sign, it's like no other personal computer you've seen.

In data processing, the Wang Professional Computer is faster than any other personal computer we've tested.* Faster than IBM. Faster than Apple IIe. Faster than DEC Rainbow.

What's more, with the Wang Professional Computer you can have unsurpassed communication capabilities and up to 640KB in memory. It even gives

you more "help"—a feature that lets you access computer-aided instruction right in the middle of any operation and then go right back to where you left off.

Wang also gives you a choice of the most popular software—including Wang Word Processing, the number one word processing in the world.

The Wang Professional Computer. In the race to office auto-

mation, it makes the competition look like they haven't even started.

For more information on the Wang Professional Computer, call 1-800-225-9264. Or write to Wang Laboratories, Inc., Business Executive Ctr., One Industrial Avenue, Lowell, MA 01851.



The Wang Professional Computer.

© 1983 Wang Laboratories, Inc.
*Benchmarks using CPU-intensive, interpretive BASIC programs.

WANG

The Office Automation Computer Company

Since implementing the system in 1979, Bierman has augmented his three-person staff by only one, rather than the two or three additional workers he estimates would have been required without the computer. In addition, improved accuracy in tracking lost payments and providing the correct processing codes have added to the cost-effectiveness of the \$22,000 system.

But probably the biggest advantage, according to Bierman, is that it organizes the pharmacy. All information is stored in one place—the computer. No file cabinets are needed to store insurance forms, patient files, etc.

Bierman says he is pleased with the service he has received from Pacific Pharmacy Computers. He says the company has updated the software and continually enhances it at no additional charge.

In offering criteria for other would-be pharmacist computer users, Bierman suggests seeking out a system that replicates the way a drug store actually functions. "The system should be simple and have a logical flow that makes sense to the user," Bierman says. "That way, the cutover time will be productive and the training period minimal."

Electronic Music Swings On The Air Waves

Bob Federer is one half of a songwriting team with a difference—his partner is an Atari 400 personal computer. The first product of this collaboration—a synthesized tune called "Prisoner of Love"—may never make the hit parade, but its unique sound is bound to create some interest.

"The beat generated by the Atari's built-in synthesizers was the beginning of the tune," says Federer, a 31-year-old engineer at the Round Sound Studios in Toronto, Ontario. "All the other parts of the song were built around it."

Federer developed the "Audio Processing Lab," a program which allows him to use a joystick to place different values into the computer's audio control. The program sets up a routine that digitizes base 10 numbers. "This allows me to create flaps—status indicators associated with special conditions—so when I POKE a decimal number into the audio control, the flags on the screen show me what sounds I've created," says Federer.

"You have basically a five-octave range, but this can be increased to eight octaves by jiggering with the audio control," says Federer. "You can get very precise tuning and extended range of the sound register."

Federer has been pleased with the "Audio Processing Lab," which he says took him only two days to develop. "It allows me to monkey around with the different sound channels," he says. "And there are so many different combinations that this is about the only way to experiment."

"Prisoner of Love," Federer admits, is still in its begin-

ning stages. "I'm not sure if there will be any singing on the record," he says. "It will probably be mostly instrumental using a lot of synthesizer." The Atari is responsible for the background rhythms.

But the real issue in Tin Pan Alley is whether the song will be a hit. "Of course it will," laughs Federer. "It's got a contemporary sound and I think anybody listening to it would be fairly interested."

Musical programming by computer is "happening all the time," says Federer. At Round Sound Studios he also works on a Roland MC-4 microcomputer. "It'll store about 4000 notes and play about eight different parts at once. I can just keep layering and layering."

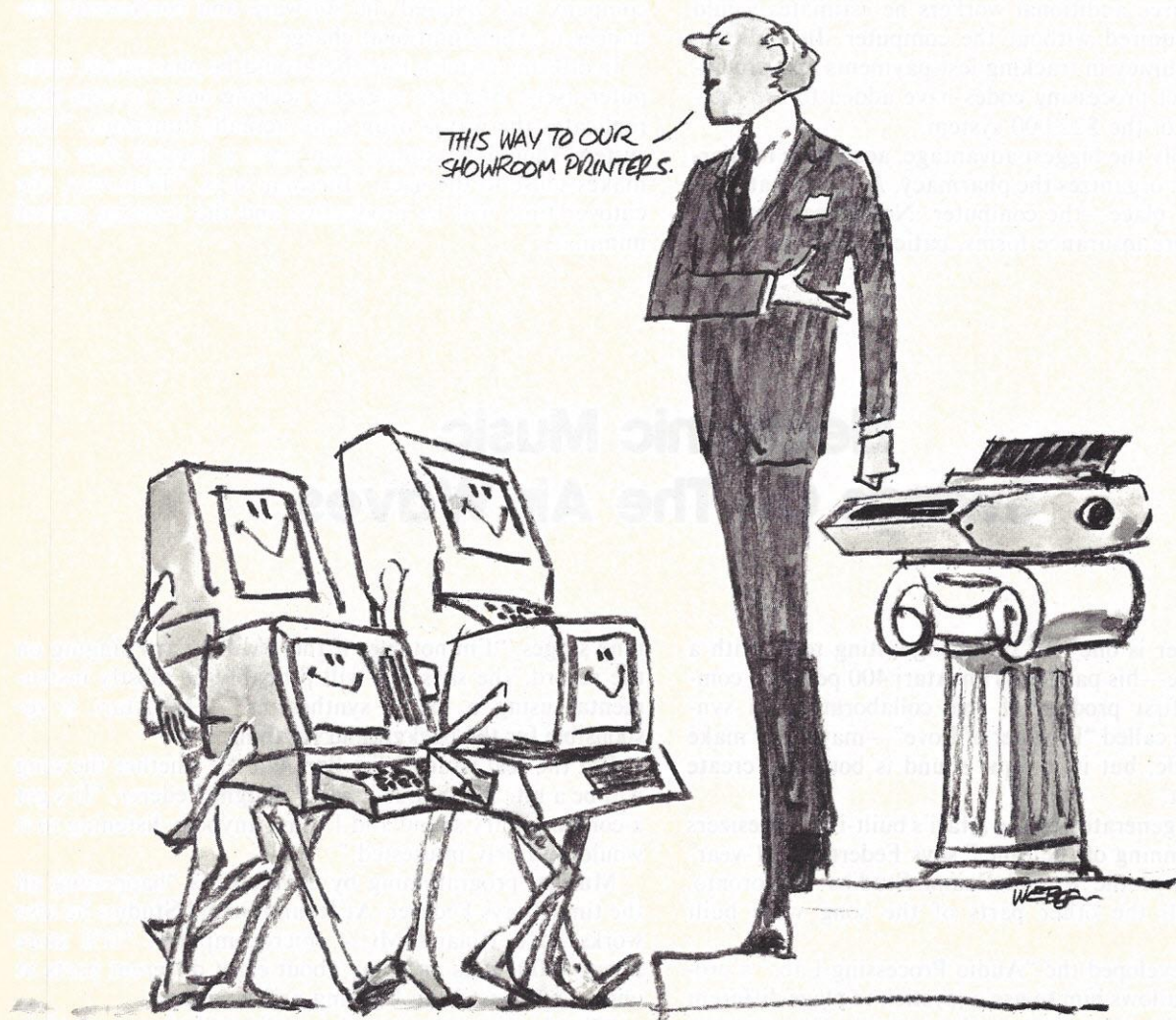
"People will come into the studio and give us an idea, or tell us the type of feeling they want to achieve," he says, "or they'll give me 50 different adjectives." Then it's up to Federer to find the right sound for the client.

One of his most recent endeavors involved a commercial for Canada's "Cash for Life" lottery. The drum containing the lottery tickets made no noise, so Federer was asked to synthesize the sound of the spinning drum. "I had to make it sound like something exciting was really going on."

"Prisoner of Love" is Federer's first collaboration with an Atari, but it probably won't be his last. He seems to have become a "Prisoner of Love" to his musical computer, and is already anticipating future possibilities. As he explains. "It's like a marriage between traditional sounds and the whole new range of sounds the computer can come up with."



THE 620 PRINTER, BECAUSE PC's DESERVE DIABLO QUALITY, TOO.



A personal computer is every bit a professional computer. And so should your printing be—professional, that is.

Diablo's 620 printer is the high quality member of the Diablo family that's inexpensive enough for even the most modest micro.

The 620 prints at 25 characters per second, and runs trouble-free for over 4000 hours. Word processing features are built-in; as is the industry standard serial interface. Add a full family of paper handling accessories and the 620 is a complete printing system.

Now, with performance like that, why ask a typewriter to do a printer's job?

The most recognized (and respected) name in printers for business, Diablo believes that whatever the budget, quality must be a standard feature.

Diablo printers, when every word counts.

Diablo

a Xerox company
24500 Industrial Boulevard
P.O. Box 5003
Hayward, CA 94545

Call operator 606 for the authorized Diablo dealer or distributor nearest you: (800) 824-7888, in CA call (800) 852-7777.

ONE



Special Introductory
Prices
5 meg — \$1595.
10 meg — \$1995.
15 meg — \$2495.
20 meg — \$2995.

FOR ALL

E • IBM-PC • APPLE II • TRS-80 • R

Percom Data Corporation has one hard disk drive system for just about ALL personal computers . . . including of course . . . IBM®-PC, APPLE® II, and TRS-80®. Percom Data's innovations with 5¼" Winchester technology mean that for most personal computers . . . having a reliable hard disk system is as easy as hooking up a cable.

A Percom Data PHD™ will interface with your present system . . . and your future system . . . so if you do change computers, you can still keep your most important investment . . . your Percom Data Hard Disk Drive.

Because Percom Data helped create the industry standards of today . . . new designs in software and hardware will make your selection of a Percom Data Hard Disk Drive pay off tomorrow through system compatibility.

A Percom Data PHD works to capacity because we take the time to correctly develop interface software to your computer which leaves no performance holes for you to fall into. Percom Data knows software functionality is the key to hardware performance.

Today, Percom Data PHD supports a variety of software to match your computer:

IBM®-PC, PC DOS™ 1.1 OR 1.0

CP/M-86®, CONCURRENT CP/M-86™

APPLE®, DOS 3.3, CP/M™

TRS-80® MODELS III & I, DOPLUS, LDOS

IMAGINE . . . Percom Data Winchester 5¼" technology . . . for today's computers . . . and tomorrow's.

To receive an informational booklet describing Percom Hard Disk Systems, or to determine if we have a system for your computer call our **Hard-Line Hot-Line at 1-800-527-1222.**

We will also give you the name of a nearby authorized Percom Data Dealer.
Dealer inquiries are welcome.

PERCOM DATA
CORPORATION

Expanding Your Peripheral Vision

DRIVES • NETWORKS • SOFTWARE

(214) 340-7081 • 1-800-527-1222 • TELEX: 73-0401 (PERCOM).

IBM is a registered trademark of International Business Machines. APPLE is a registered trademark of Apple Computer, Inc.
TRS-80 is a registered trademark of Tandy Radio Shack Corp. PHD is a registered trademark of Percom Data Corporation
COPYRIGHT 1983 PERCOM DATA CORPORATION

CIRCLE 23

When Congress Asks To See The Bill

The Congressional Budget Office is using
personal computers to make sure its forecasts
are right on the money

by Jeffrey Rothfeder, Associate Editor

For personal-computer owners, high-level econometrics data bases were always a world away, available only on larger computers. But now, due to the efforts of a deputy director at the Congressional Budget Office and the growing numbers of personal computers on America's desk tops, the two largest econometrics modelers, Data Resources, Inc. of Lexington, Mass. and Chase Econometrics/Interactive Data Corp. of Waltham, Mass., have shifted their computer emphases. They have developed software that offers personal-computer owners access to some of the best budget planning and industry forecasting statistics in spreadsheet formats.

To the uninitiated, the term "econometrics" conjures up the thought of mysteriously jiggered numbers which, because they are so complicated, lead only to dead ends when used in business planning. But for people who use these models often, they are a godsend—a lifeline to timely economic information that makes the development of five-year (or five-week) plans an easier task.

Generally, econometrics models provide both industrial economic reports, and current statistics and forecasts on key national economic indicators. These include inflation patterns, stock and bond market highs and lows, interest rates, and wage scales. The models offer flex-

ibility and accuracy for business planning. For instance, a manufacturer who supplies a product line to a particular industry can use the growth forecasts for that sector to decide how large an inventory he should develop over the next few years. Or, if a firm is preparing a budget and must project costs for the next quarter, it can draw on the patterns represented by hundreds of econometrics price indices to forecast future costs against historical costs. Perhaps most important, econometrics data bases break down U.S. economic factors—such as inflation, interest rates, and housing starts—into national and regional barometers, enabling firms to examine links between the broadest economic trends and their own situations.

In econometrics, information is the linchpin. But unless the data-base user can manipulate the data to produce answers to his questions, the information is useless. It's at that point that spreadsheeting makes its power felt. The recent advances in downloading econometrics data onto personal computers carry with them the added advantage of this information arriving in a spreadsheet or electronic worksheet format. The user can use this format to create individual scenarios for his particular business needs, and let the computer calculate the bottom line.

Bob Harris at the Congressional

Budget Office was one of the first to see the importance of hooking econometrics data bases into personal computers and spreadsheets. Those data bases, Harris realized, would help meet the need for accurate budget forecasting—which is the CBO's reason for being. Since its inception in 1975, the agency has been charged with providing the Budget, Appropriations, and Finance committees on both sides of Capitol Hill with five-year cost estimates for each bill they are considering, as well as a yearly overview of the President's proposed federal budget.

The CBO's record has been nearly flawless. For instance, when President Reagan, in fiscal 1981 which ended in October 1982, predicted a budget deficit of \$60 to \$80 billion, the Congressional Budget Office countered that its forecast showed the deficit would be closer to \$160 billion. The CBO target was off by \$20 billion—and despite the enormity of the number, a very close estimate compared with other, more popular estimates.

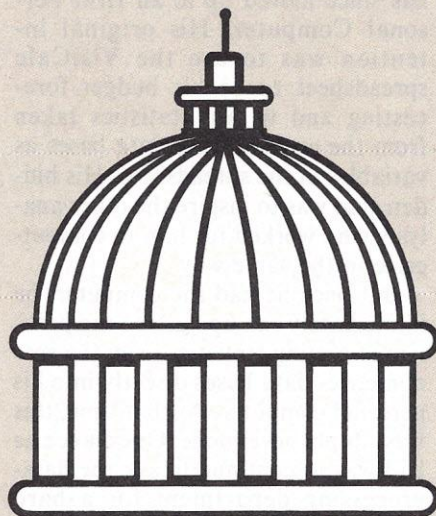
According to Harris, CBO's accuracy is due to the high quality of data the agency relies upon to perform its analyses. And having personal computers to spreadsheet the extremely sophisticated information CBO receives from both its own mainframe data base and the econometrics modelers, assures that the agency turns



"Having personal computers to spreadsheet our high quality data assures that we turn out on-the-mark projections."

Bob Harris, a deputy director at the Congressional Budget Office in Washington.

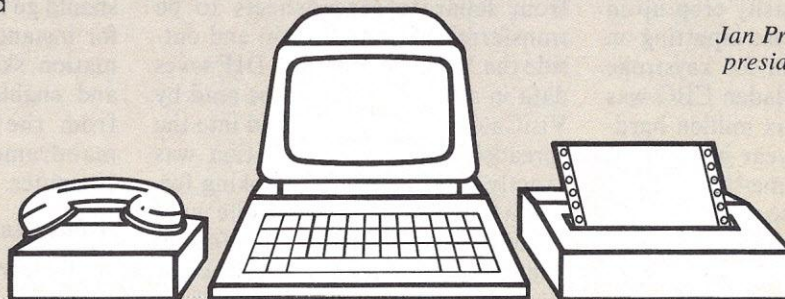
Econometrics firms are just completing projects that will give personal computer users access to complex mainframe data without complicated programming.



CONGRESSIONAL BUDGET OFFICE



ECONOMETRICS MODELS



Econometrics models, such as those provided by Data Resources, Inc. and Chase Econometrics, offer industrial economic reports, current statistics, and forecasts on key national economic indicators.



"We created the DataKits because we were sitting on a massive communications network that we had to make accessible to personal computer users."

Jan Prokop, senior vice president for computer services, at Data Resources, Inc.

out on-the-mark estimates and projections. Nevertheless, when Harris first joined CBO, things were not working nearly as smoothly as they are now.

For one thing, Harris could see that for the CBO to operate efficiently he had to bring "essential budget forecasting data home to a personal computer" and off the mainframe. "A good analyst must be with his data and have it in his hands," Harris says. "He can't always be in the process of reaching for it."

Actually, this was not a difficult conclusion for Harris to reach. When he came to the CBO in August 1975, computerization was restricted to time sharing, dumb terminals, and expensive data-processing departments.

At the time, CBO analysts worked out their cost/benefit estimates for each bill, or a five-year plan for the federal budget, by asking the data-processing department to get them hard copy of a specific statistic offered by one of the econometrics services. Then they figured out their forecasts using calculators.

Harris says this method of operation was completely inefficient. There was no audit trail to lean on if CBO statistics were questioned; and there were no archives to turn to if a bill was reintroduced with slightly different variables. Time was wasted in paper and data-processing log-jams. Errors could easily crop up in the final results because inputting on a calculator left room for keystroke mistakes. The paper-laden CBO was being buried under six million hard-copy printouts each year just for annual budget work. Time-sharing connect costs continued to mount yearly; and perhaps most important, without spreadsheeting, various scenarios could not be played out easily—only one forecasting avenue was usually followed.

To put an end to the clumsy bureaucracy that was burgeoning at the CBO, Harris bought an Apple II

computer in September, 1981. He has since moved up to an IBM Personal Computer. His original intention was to use the VisiCalc spreadsheet to do his budget forecasting and to use statistics taken from the econometrics data bases as variables in the spreadsheet. His hidden goal was to inspire the other analysts who worked for him to computerize in the same way.

But once he had the computer, he immediately ran up against the problem of getting statistics from the econometrics data bases directly into his personal computer. At that time, this was simply never done. One choice he had was to continue to ask the data-processing department for a hard copy of the data and key it into the spreadsheet himself. But he rejected that option immediately. He did not want his personal computer to be used as a glorified calculator.

Bypassing an obstacle

To overcome this obstacle, Harris started with the obvious. The most common way to tie information provided by a data base into VisiCalc is by using the DIF function provided as a part of the spreadsheet package. DIF, which stands for data interchange format, was created by VisiCalc developers as a way to allow unrelated software to share data. DIF can be used in two ways. Within the VisiCalc program, DIF allows data from separate spreadsheets to be transferred back and forth; and outside the VisiCalc program, DIF saves data in a format that can be read by VisiCalc and then integrated into the spreadsheet. The latter option was exactly what Harris was looking for. He needed to download the econometrics data from the mainframes and have it formatted so that when he loaded VisiCalc, the spreadsheet could read the data. Unfortunately, pulling information out of mainframes is not one of DIF's strengths.

"The DIF feature is nice when you are operating within the Visi family,"

Harris says. "It is a good transfer program for sending information between VisiPlot, VisiTrend, VisiCalc, and the like. And it doesn't require cumbersome commands for that purpose. But to move large quantities of information into VisiCalc from an outside data base, DIF is totally inefficient. Explaining to the computer what you want to do requires inputting almost two lines of program data for every line of information you want to grab from the data base."

What Harris is getting at is the fact that for each separate item of data to be downloaded, the DIF user has to tell the computer what spreadsheet "cell" (every box in a spreadsheet is termed a cell) that item is to go into. So, if Harris wanted to pull 50 economic factors from an econometrics model, he would first have to type in 50 separate lines of instructions to enable DIF to plug these factors into their correct VisiCalc cells.

Harris, who had worked as an information services chief earlier in his career, knew enough about computers to know that DIF was not an efficient route for him. Instead, he spent a few long days and nights and came up with a subroutine that bypassed many of DIF's failings. His subroutine simply tells the personal computer that it's going to get, say, 50 items of information from the mainframe, and that these items should go into VisiCalc cells A1-A50, for instance. That one line of information skirted DIF's 50-plus lines and enabled a successful download from the econometrics modeling mainframes into Harris's personal computer.

A baseline inflation rate

And Harris will soon complete the agenda of his ambitious efforts during the next few months in preparation for five-year CBO budget projections.

Harris will download onto the IBM Personal Computer all the price and

*A good analyst must be with
his data. He can't always
be reaching for it.*

inflation information DRI has gathered from 1970 to 1982. His intent is to come up with an accurate inflation gauge for the CBO budget. He can then turn the connect time off with the DRI mainframe, and save the data, which will be programmed to fit into specific VisiCalc cells. When he boots up VisiCalc, he will have a spreadsheet that lists overall inflation rate as the bottom line, and individual price factors—food, homes, utilities, foreign currency costs, and labor salaries—as the items influencing the bottom line.

Harris will examine the impact of the costs of food, home ownership, oil, exchange rates, and wages by eliminating them from the spreadsheet and then determining the impact of their absence on the overall rise in inflation. By isolating each factor from the total economic picture, and letting the computer figure out the leftover inflation rate, Harris will work out a formula that measures the “underlying inflation”—that part of the graph that excludes the shocks of drastic oil, food, and home price changes.

In a similar analysis, recently, the CBO concluded from DRI data that inflation between 1979 and 1982 has actually decelerated by approximately three percentage points, rather than the 13 percentage points that the Reagan Administration is taking credit for. As a result, these figures, compiled with a VisiCalc spreadsheet, have become the inflation barometer for all statistical and budgetary ruminations by the CBO.

In the same way, the CBO is currently doing an analysis of the infrastructure of the United States and estimating the future costs of keeping the nation's bridges, highways, and waterways in good repair. The CBO analyst working on this project downloaded onto his spreadsheet from an econometrics model, forecasts of the cost of materials and labor, inflation rates, and federal revenues. He then allowed the personal computer to cal-

BEYOND ECONOMETRICS

Econometrics modelers are not the only corporate personal-computer users who are able to download information from mainframe information banks onto their computers. A new venture from a well-established advertising and media research time-sharing service is now offering clients with personal computers spreadsheet versions of over 100 separate statistical data bases. These include demographics and ratings reports based on the Neilson, Arbitron, and Media Mart surveys as well as a raft of proprietary industry studies.

Tel-Mar Group, Inc. was founded in 1968 and was the first firm to provide publishers, broadcasters, and advertisers with mainframe-computer access to the type of information that is essential either when they are considering which media to advertise in, or—in the case of broadcasters and publishers—when they are looking for advertisers to entice into their pages or onto their airwaves. The 15 years of Tel-Mar's existence have been successful ones; today, the firm has over 700 clients.

But despite its success, Tel-Mar has not stood pat. Its computer emphasis has shifted with the years. Mainframe access remains a hallmark of the firm's operation, but reaching the personal-computer owner is now central to the company's approach to selling information.

“Our job is to solve a problem for our clients,” says Stanley Federman, chairman and president of Tel-Mar, “and we recognize that VisiCalc and other personal-computer spreadsheets are part of the solution in many of our clients' offices. With this in mind, we have to allow those who pay for our information the opportunity to download the data in a spreadsheet format onto their personal computers.”

Federman is a veteran of the advertising wars, and as such he has over the years grown keenly aware of how important well-ordered information is to a well-oiled media firm. He was originally in the marketing division at

Young and Rubicam Corp. and eventually moved over to its data-processing department.

Any personal-computer owner who subscribes to the Tel-Mar data base can, by using his own communications software, access the Tel-Mar mainframe and receive the information in one of two ways. First, it can be called up in the DIF format, a configuration that enables the personal computer to input the data into the cells of any spreadsheet that recognizes DIF. These include VisiCalc, SuperCalc, 1-2-3, and MultiPlan. Or the information can be received as a simple ASCII file, which is a basic data language, to be formatted into any specialized program that the user chooses. If the DIF format is chosen, no user programming is required; the complexities of working with DIF are dealt with at Tel-Mar's end.

A marketing division manager, for instance, might want to run a cross-tabulation to graph the frequency of use of 100 different products, and have it broken down into 24 age and income brackets.

“He can get on-line with our service and call for the particular cross-tab that he is looking for,” Federman says. “Then after it is downloaded into his spreadsheet, he can do any number of demographic comparisons to see where his new product fits and how it compares with the current marketing schemes used by competing products.”

Tel-Mar is not selling the service on a piecemeal basis. Only Tel-Mar subscribers, who also have to subscribe to a data base that Tel-Mar handles on its mainframe, can access the information on their personal computers.

Tel-Mar's steps into personal computing are not at all tentative. The company plans to go a lot further than downloading mainframe data. Federman says his firm intends to introduce a full line of advertising software as well as a communications package for personal-computer users in the media community over the next few months.

*Harris's approach to econometrics
has trickled down to have an effect
on planners across the nation.*

culate the final bill for keeping the infrastructure in shape. The beauty of doing this type of calculation on the computer, says Harris, is that if certain materials' costs, for instance, leap or fall during the next year, all the analyst has to do is call the spreadsheet onto the computer screen, change the price of the affected material, and the computer will recalculate the bottom line.

A \$160 billion deficit

Dealing with \$700 billion budgets may be a bit over the heads of most corporate managers and small businessmen. Indeed, calmly accepting a \$160 billion deficit would be about as viable as asking the bank for a loan when your firm has already filed for Chapter 11 status. But Bob Harris's approach to econometrics and business forecasting on the personal computer has, it turns out, trickled down to affect business planners across the nation. At least in part because of Harris's trailblazing, DRI has just completed a joint venture with VisiCorp that offers Apple users—and soon IBM users—the chance to do what Harris is doing, but without having to write a separate computer subroutine.

The joint venture produced two interwoven software packages, VisiLink and DataKits, which connect the personal-computer user to DRI and enable him to retrieve DRI information in the VisiCalc spreadsheet format. The computer owner pays a fee for the connect time it takes to download the data, and a fixed price for the information itself. The data come in three basic categories: business analysis, which includes details of most major industrial segments of the economy; investment analysis, which is a portfolio and individual stock reporter; and an economic analysis, which covers financial forecasts and national economic trends.

"We created the DataKits because we were sitting on an expensive communications network that, with the

proliferation of the personal computer in corporate America, had to be accessible to its users as well," says Jan Prokop, senior vice president for data processing. "The tide had simply turned that way. Now, rather than DRI presenting the data in finished form, the data can be manipulated at the site of the personal computer."

One of the first DataKit/VisiLink users in the country was Deena Lind, a consultant at Tsai-Spector Research Associates, a New York City-based firm that specializes in aluminum industry analyses. Lind, who was a beta test user of the software on her Apple II, got the package last July to prepare linear reports on the state of the aluminum industry.

"We're a small company," Lind says, "and for our needs the \$1100 a month subscription fee we were paying to our econometrics time-sharing service was way too high. We only needed access to data as our analysts required it, not constantly."

Enter the DataKit/VisiLink package. To use the software, the computer owner first boots up VisiLink which, through a modem, connects his computer to the DRI mainframe. After a password and the user's credit card number are entered, a DataKits catalog appears on the screen.

"My earliest uses involved asking for the Steel Report DataKit which is in the business category," Lind says. "Then I was asked which type of forecast I wanted: 'an optimistic one, a pessimistic one, or a most likely.'"

She chose, at first, "most likely," but, in time, used all three forecasts for her projections. Then she was prompted to enter whether she wanted quarterly or annual data and for what period of time.

After answering these questions, Lind received a steel industry spreadsheet for the preceding three years and the succeeding four. The spreadsheet included such industry-wide items as average salaries, price fluctuations, overhead costs, factory capacities, and manufacturing costs.


"I then manipulated the data on the spreadsheet by using the steel industry-wide percentages as relative percentages that can be considered accurate for the aluminum industry in particular," she says. "What I came out with were separate forecasts covering salaries, costs, and price predictions for aluminum."

Then, using the VisiCalc DIF format, Lind transferred the data to VisiTrend and VisiPlot software to prepare charts detailing each forecast.

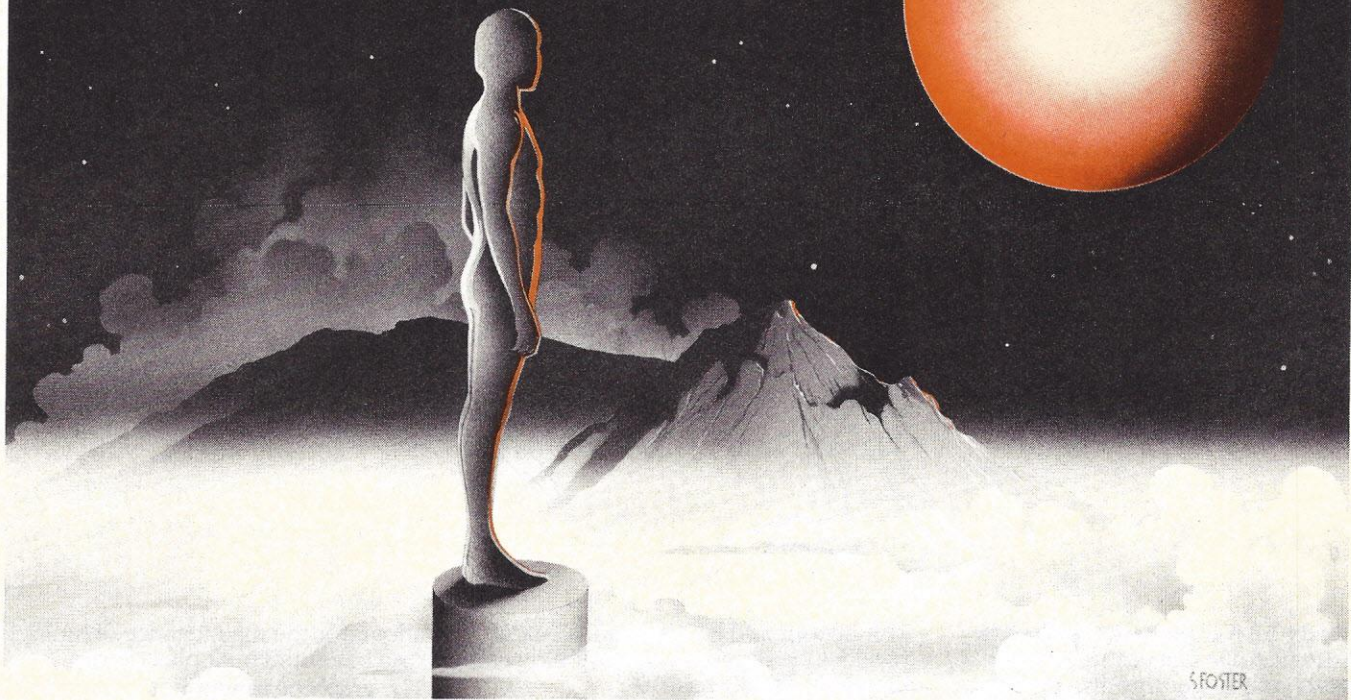
Following in the wake

The DataKits are making converts of an increasing number of personal-computer owners who were becoming overwhelmed by time-sharing costs and limitations—users who wanted more control over how the data were massaged. So DRI's closest competitor, Chase Econometrics, has quickly followed in its wake.

In a joint venture with Microsoft, the manufacturers of the MultiPlan spreadsheet, Chase has produced software called Financial Xchange, which brings its data to personal-computer users in either a VisiCalc template for the Apple, or a MultiPlan template for the IBM. The difference, between Chase's system and DRI's is that the Chase data and Financial Xchange are available only to subscribers to the data base. Thus, the Chase plan doesn't cut down on time-sharing costs, but does bring the power usually reserved for mainframes to the personal computer.

When Bob Harris made his first personal-computer connection to mainframe econometrics data, it made no difference to him that he was tapping an unexplored region of the marketplace. His success, though, has truly had an effect. It has made using econometrics statistics on the personal computer a reality for many businessmen who couldn't afford the cost of time sharing, or who didn't understand the virtues of the spreadsheet format. 

INSTANT INTELLIGENCE



...FOR BUSINESS PEOPLE WHO THINK AHEAD. In a world deluged with information, how can you stay on top of all that you need to know? How can you manage information within your own company more efficiently and keep up-to-the-minute on news and data in your industry or profession as well? More and more busy executives are discovering that personal computers and THE SOURCE, the instant intelligence network, can help them solve information overload, eliminate communications delays—and cut costs too.

THE SOURCE lets you create your own electronic communications network of branch offices, customers, suppliers or associates—near or far—without concern for time zone differences, telephone tag or computer compatibility. What's more, THE SOURCE continually scans and updates thousands of business and news reports around the clock and selects for you—at your command—only what you want, for immediate or later review, at your convenience.

Your subscription includes over 750 services:
 Electronic Mail • UPI newswire (general, sports, business)
 • Business magazine abstracts • Stock and financial market reports and news • Travel reservations and airline schedules • Electronic transactions • Mailgram messaging • Computer conferencing.

All for as little as ten cents a minute.

Never has so much been so accessible for so little.

If you have a personal computer, modem and a telephone, you are ready to use THE SOURCE. To subscribe, just visit your nearest computer dealer or send the coupon and we'll rush you a FREE subscription information package.

Source Telecomputing Corporation is a subsidiary of The Reader's Digest Association, Inc.

Mail to: Source Telecomputing Corporation
 Dept. AD-8
 P.O. Box 4387
 McLean, Virginia 22103-4387

80M

Name _____
 Title _____
 Company _____
 Address _____
 City _____ State _____ Zip _____

THE SOURCEsm
 AMERICA'S INFORMATION UTILITY

1616 ANDERSON ROAD, McLEAN, VA 22102
 1-703-734-7500

(sm) A service mark of Source Telecomputing Corporation
 © Source Telecomputing Corporation 1983

INTRODUCING 1-2-3.TM IT'LL HAVE YOUR IBM/PC JUMPING THROUGH HOOPS.



Meet 1-2-3 — the remarkable new software package that puts more raw power at your finger tips than anything yet created for the IBM PC. 1-2-3 actually combines information management, spreadsheet, and graphing in one program that can perform all three functions interchangeably and instantly at the touch of a key. That's power.

To explain: since 1-2-3's information management, spreadsheet and graphing functions reside in memory simultaneously, you can go from retrieval to spreadsheet calculation to graphing instantly, just by pressing a few keys. So now you can experiment and recalculate and look at data in an endless variety of ways. As fast as your mind can think up new possibilities. There's no lag between you and the computer. And that's a new kind of power — power that's greater than the sum of its programs.

The spreadsheet function.

If 1-2-3 were just a spreadsheet, you'd want it because it has the largest workspace on the market (2048 rows by 256 columns). To give you a quick idea of 1-2-3's spreadsheet capabilities: VisiCalc's spreadsheet for the IBM PC offers 15 arithmetic, logical and relational operators, 28 functions and 32 spreadsheet-related commands. 1-2-3 has 15 operators,

41 functions and 66 commands. And if you include data base and graphing commands, it actually has 110!

In addition, 1-2-3 is up to 50 times as fast as established spreadsheets. With all the features you've ever seen on spreadsheets. 1-2-3 also gives you the capability to develop customized applications (with 26 macro keys) and lets you perform repetitive tasks automatically with one keystroke. If 1-2-3 were just a spreadsheet, it would be a very powerful tool. But it's much, much more.

The information management function.

Add to 1-2-3's spreadsheet a selective information management function, and the power curve rises at an awesome rate. Particularly since 1-2-3's information management capability reads files from other programs such as WordStar, VisiCalc and dBase II. So you can accumulate information on a limitless variety of topics and extract all or pieces of it for instant spreadsheet analysis. Unheard of before. Specific 1-2-3 information management features include sorting with primary and secondary keys. Retrieval using up to 32 criteria. 1-2-3 performs statistical functions such as mean, count, standard deviation and variance. It can produce histograms on part or all of the data base. 1-2-3 also

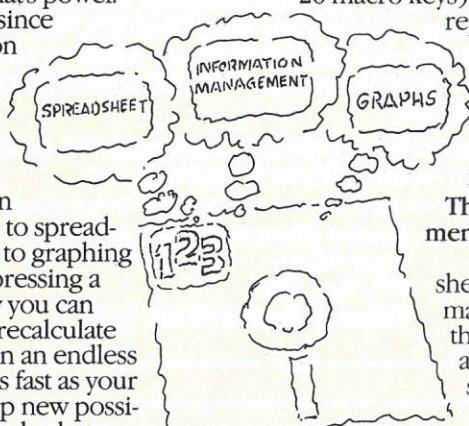
allows for the maintenance of multiple data bases and multiple criteria.

The graphing function.

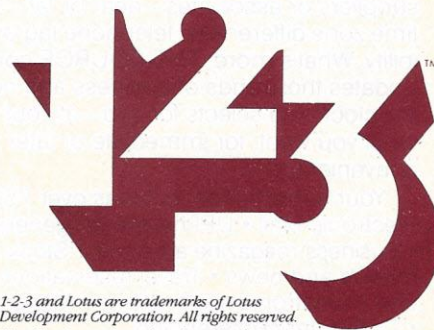
1-2-3 enables you to create graphs of up to six variables using information already on the spreadsheet. And have it on screen in less than two seconds! Once you've made a graph, three keystrokes will display it in a different form. If data on the spreadsheet changes, you can display a revised graph with one keystroke. This instant relationship of one format to another opens up a whole new application area. For the first time graphics can be used as a "what if" thinking tool!

For a full demonstration of 1-2-3's remarkable power, visit your nearby 1-2-3 dealer. For his name and address, call 1-800-343-5414 (in Mass. call 617-492-7171).

Lotus Development Corporation,
55 Wheeler Street, Cambridge, MA 02138.



Spreadsheet, graphing,
information management all-in-one.



1-2-3 and Lotus are trademarks of Lotus Development Corporation. All rights reserved.
WordStar is a registered trademark of MicroPro Inc.
VisiCalc is a registered trademark of VisiCorp.
dBase II is a registered trademark of Ashton-Tate.

Computer Literacy: The Fourth "R"

"Blessed are the young, for they shall inherit the future." You can help your children prepare for their future with personal computing

by Trudy E. Bell, Associate Editor

A five-year-old boy and his eight-year-old sister sprawl on the living-room rug. He controls the drawing of an intricate geometric figure on the video screen of a Commodore PET, while she makes suggestions and notes his actions on a pad of paper. Undisturbed by their conversation, their 13-year-old brother is absorbed by the tables he's compiling on an Apple II Plus, for a report on chemical experiments he conducted over the weekend in the family garage.

Is this a family of precocious computer geniuses? Not at all—just three average children whose parents have given them the far-from-average opportunity to make personal computing as much a part of their lives as Little League, bicycles, and reading.

You only have to look at the situation in schools to see the signs of change. Today, two-thirds of high schools and one-third of elementary schools have at least one personal computer for their students—usually several more. A Personal Computer Educational Software Market Report recently published by Portia Isaacson and Egil Juliussen of Future Computing, Inc., states that by 1987 nearly all high schools will have personal computers, with an average of 35 computers per school. An exhaustive study recently completed by James Kulik and others at the Uni-

versity of Michigan has shown that children in secondary schools who have the chance to supplement their learning through personal computers learn more, do better in tests, and get better grades than children who don't have that opportunity.

As the growing use of computers in schools draws attention to the benefits of computer literacy, many parents are deciding to give their children a head start by installing personal computers in their homes. Parents are beginning to realize that if their children can get a big boost in their schooling just from having access to a personal computer for a few hours per week, they stand to gain an even greater advantage from being able to use a personal computer at home whenever they wish. According to Future Computing's report, these parents are losing no time: The fastest growing segment of the educational software market is educational packages for the home—a segment that's increasing at a rate of 71 percent a year. These parents know that children grow up quickly and that their education can't wait. They realize their children will be living in a future when not only will computer literacy cease to be a special advantage, but computer illiteracy will be perceived as a major disadvantage.

Today, many parents are considering buying personal computers for

their children in much the same way parents in the 1950s considered buying their first television. But with those plans also come many questions of which the television age is uniquely aware: How can I choose the best personal computer for my family? How can we best integrate personal computing into our home life? How can I encourage my kids to explore all of the computer's capabilities and not just use it to play video games?

Computer literacy at home

Computer literacy has been called the "fourth R," a new addition to the familiar trio of reading, 'riting, and 'rithmetic. But computer literacy, like written language literacy, is an ambiguous phrase. Are you literate when you can make out a menu or a newspaper? Or are you literate only when you're comfortable with Shakespeare and Melville? In a similar way, computer literacy is a slippery matter of degree. Are you computer literate when you can use a simple word processor, or only when you can think in BASIC as if it were a second language? It's probably fair to define basic computer literacy as some familiarity with what computers do, and the ability to make them do what you want. Doing all that with pleasure, originality, and style might better be called computer fluency.

Basic computer literacy—like basic reading—can begin at home, even

before you buy your first personal computer. Chances are your older kids have already seen personal computers and are curious, if not surprisingly knowledgeable. Chances are even greater that they'll be overjoyed when you announce that you plan to have one at home for them. Younger children may be a little hazier on the basics, but you can easily introduce them to the ABCs of what computers are and what they can do. A number of books and magazines are ready to help. (See sidebar on page 67.)

A small dilemma

Facing the actual task of buying a first personal computer for your family can be a bit of a dilemma—especially if you recall how time consuming it may have been to select one for your office. A good personal computer is at least as expensive as a dishwasher or stereo—and, as with any major investment of family funds, you want to be sure to get the best value for your money.

The selection of personal computers suitable for home use is broad, and you may find that choosing one depends on criteria rather different from the ones you used to pick a computer for the office. Comparison shopping over the whole range clearly will take time—time your schedule simply may not allow. You may be tempted to just write out a check for what seems the best all-purpose machine... but having seen the disappointment of office employees not consulted as to their needs or preferences, you won't really want to present the computer at home as a *fait accompli*. How can you choose the right personal computer efficiently, with the least amount of trial, error, and fruitless effort?

Try the old management technique of using one problem to solve another: Get your kids involved right from the start. Have them do a lot of the spadework. Since you're buying the personal computer to help prepare

them for their future, this process is a golden opportunity to start their education even before you buy. Older children, when charged with an important adult responsibility, rise to the occasion: They can be indefatigable researchers, enthusiastic and serious. With proper direction, they may do a market survey of a completeness and quality that might astound you.

Examine various computer magazines with your children, reading ads and reviews of hardware and software—they'll quickly catch on. Discuss what features each of you thinks is important in the personal computer, and what you want to do with it—all the way from playing specific video games to learning WordStar.

This process of definition is also a good time to air questions lurking within each one of you about getting a personal computer. Are you afraid your children will spend too much time playing video games instead of doing homework or exploring programming? Are younger children apprehensive that an older brother or sister may dominate the computer and not allow them enough time to learn at their pace? Is one child afraid of losing a sibling as a playmate because he's absorbed with the new computer? These are the kinds of questions you can work out together in advance to integrate the personal computer into your home and make sure it's eagerly welcomed by all.

Selecting the home computer

As each child defines what he or she wants to do with the computer, write a list of these considerations. Encourage the kids to clip ads, write to manufacturers for more information, visit computer stores to look at various machines, and collect brochures. If your children are lucky enough to attend a school that has personal computers, talk to their teachers about their experiences with kids and com-

puters. Weigh those observations against what you hear from the sales representatives at the local computer store. Remember, a sales rep's mission is to sell computers, whereas a teacher is likely to have the children's specific needs and well-being closest to heart.

Which to buy?

At this point your key consideration may be whether to buy an inexpensive computer for your kids to learn on—such as the TI 99/2 by Texas Instruments or the Timex/Sinclair ZX 2000, or to start right off with a full-fledged system such as an Atari 800 or Apple II Plus. There are tradeoffs implied in both cases.

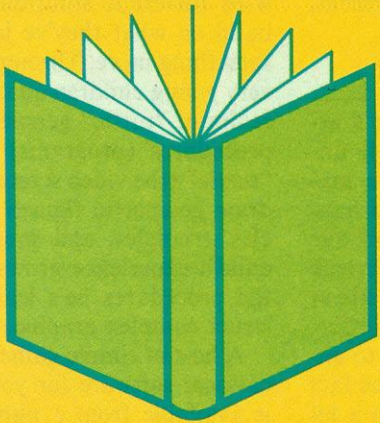
If you opt for the less expensive computer, the chance of childish damage or breakage may become less worrisome to you. A membrane keyboard may seem like a good idea if your children tend to do everything with a peanut butter and jelly sandwich in one hand. However, your children may quickly master the smaller machine and outgrow its potential—without further chance to explore the true power of personal computing. If you consider upgrading at this point, you will once again be faced with the decision of which personal computer to buy. On the other hand, starting out with a more basic computer may help all of you to reach a more solid definition of what is important to you in the next purchase.

Depending on the ages and personalities of your children, you may want to start at the outset with a full personal computer. Discuss with them the fact that even though a computer can play games, it is not a toy. Set up basic rules for its proper care, respect, and use.

There are other hardware tradeoffs as well. Should you go for a relatively inexpensive cassette-tape memory storage? Or should you spend the extra money for floppy disk drives? The disks may be a challenge

*Searching for a personal computer is
a golden opportunity to start your
children's education before you buy.*

THE FOUR "R's"



Reading

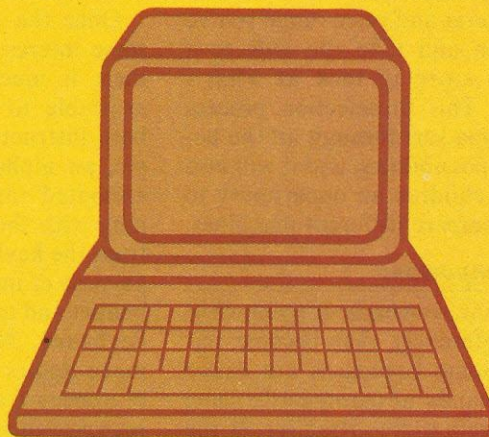
Aa Bb

Cc Dd

Writing

$$\begin{array}{r} 5 \\ + 2 \\ \hline 7 \end{array}$$

Arithmetic



Computing

for small hands to insert and remove. Yet loading a program from tape can require 30 to 90 seconds—and a minute-and-a-half can be a very long and frustrating time in the attention span of a child.

And, of course, there's your own preference. Do you intend to use the computer for your own work—say, after the kids are asleep? In that case your own preferences for memory, software, and speed must be considered. If there's any chance at all that you might enjoy the convenience of a computer at home, you might be better off with a more capable system—and a firm set of rules about eating or drinking near the machine.

Once you've decided what type of computer to buy, determine how much you want to spend and tell your children the price range you're considering. Depending on the ages of the children, you may want to suggest that they each allocate a portion of their allowance or earnings from after-school jobs to the project—especially if they want to buy game attachments or software beyond what you have in mind. See what machines fit the criteria and price range you've decided on and take the kids to a computer store to look at what's available. This preselection process will help you sort through all the bewildering possibilities, and it will also give your children an opportunity to try and compare different machines.

What's important

At this point, step back: It's your children's preferences that become important. Some keyboards are easier for their hands to manipulate; some displays seem more attractive. If the children are to be the principal users, in certain matters of personal preference their votes should be the deciding ones. Encourage them to try different models, and to return later by themselves if they're undecided. After all, they're making a decision they'll have to live with for several years—just as you have to live with a

car you select. Most important, when you finally bring home the selected machine, the kids have already invested a part of themselves in the choice—and will be starting to learn what it can do with a solid background of knowledge, commitment, and pride.

Never too young

Within weeks of the computer's arrival, your older children will undoubtedly be absorbed by the machine for hours at a time. But perhaps there's also a toddler or preschool-age child at home as well. Don't overlook that child's natural curiosity about this strange new flickering device, figuring the child is too young to understand. Take advantage of the fact that very young children learn a lot about the world from watching their parents and siblings, and imitating what they do. If your four-year-old stands there fascinated by the dot-matrix printer as you finish a report, take a moment to explain what's going on; point out the parts of the computer, and encourage the youngster to help in some modest way.

Once the young child has shown some interest in using the machine, there is much educational software available to make that experience both instructive and fun. For example, an alphabet package can flash animated images of objects beginning with the letter the child selects from the keyboard—serving the dual purpose of introducing him to the alphabet and to the arrangement of the keyboard. Number programs may make apples or oranges appear and disappear from the video screen in response to simple counting.

Kindergarten-age children can even begin to learn the rudiments of geometric thought and programming through the language Logo. Logo, developed by Seymour Papert and his colleagues at the Massachusetts Institute of Technology, combines the capabilities of artificial intelligence with the theories of renowned child

psychologist Jean Piaget, in order to allow children to build intellectual structures through estimation, interaction, experience, and revision. Logo encourages children to set a problem, play with the problem to experiment with different solutions, and then build on what they've learned to do something more. Through Logo, even very young children quickly enter the realm of "turtle" geometry, creating procedures (programs) for using a "turtle" (the video screen's cursor) to draw geometric figures such as circles, triangles, and squares. As the child's experience grows, he can use the procedures he's learned to construct complex graphics at will.

A host of simple game-format educational software for young children is available from a number of software companies. (See sidebar on page 67.)

Some of these uses of the personal computer for a small child may at first seem inconsequential—but remember that for very young children the world is so new that fun and learning are almost synonymous. More important, a crucial aspect of computer literacy—and certainly computer fluency—is absolute confidence. If a small child is passed over as being too young—that is, somehow not up to the computing experience, that may plant a seed of self-doubt. But a child who grows up with personal computing as a part of life will have a good chance of remaining immune to computerphobia.

The most effective teacher

Most kids enjoy learning but have a low tolerance for tedium—which may be why the same fifth-grader who can collect and catalog insects with tireless patience is restless in class. Some of what children must learn in school is fascinating—but some of it is unrelentingly dull. Rote memorization of multiplication tables, countries of the world, and the spelling of common words are among the worst offenders.

*Even very young children can
begin to learn the rudiments of
geometric thought and programming.*

Here's where personal computing really shines. Many teachers have discovered how effective personal computers can be in motivating learning through game-format educational software that reinforces knowledge in a way that's fun. A number of software packages make games out of flash cards, spelling bees, and historical facts. As with all software, some of these educational packages are more suitable, effective, and flexible than others. If you're in doubt about which ones might best supplement your child's learning, consult with the teacher—especially helpful if the school can make recommendations from experimenting with its own personal computers.

Devise a clever game

Alternatively, you can once again tap the old management technique of using one problem to solve another. If your third-grader is having difficulty memorizing the capitals of the 50 states and an older sibling is starting to learn programming, challenge the older child to devise a clever mix-and-match game of states and capitals to reduce the monotony of straight drill. Not only will the younger child be helped with his schoolwork, but the older one will be plunged into programming.

When, at around the fifth grade level, kids begin to write book reports and term papers, the personal computer used as a word processor can become an invaluable tool. For kids, the most time-consuming and frustrating part of turning in a paper is copying the first draft to make a neat, clean presentation copy. A simple word processor, such as Apple PIE or Bank Street Writer, is easy to learn and will give them a high quality finished product. Moreover, they will be learning a skill that will be useful to them in later life—perhaps even sooner than you think. You may find yourself the parent of a junior entrepreneur, earning spending money after school or over the summer by

A SAMPLING OF RESOURCES FOR PARENTS

BOOKS

Galanter, Eugene, *Kids and Computers: The Parents' Microcomputer Handbook*, N.Y.: The Putnam Publishing Group, Grosset and Dunlap, 1983. A guide for parents who are considering buying a personal computer for the family.

Papert, Seymour, *Mindstorms*, N.Y.: Basic Books, 1980.

An account of child learning and of the effects of the computer language Logo in teaching children geometrical thought and programming.

Cohn, Theodore J. and Jacqueline H. Bray, *The Magic Machine*, Peterborough, N.H.: Byte/McGraw-Hill.

A coloring book for very young children introducing them to the new family computer.

MAGAZINES

Most of the magazines currently available on children and personal computers concentrate on the classroom. Scheduled to begin publication in September, however, is a new monthly magazine *Family Computing*, on personal computing in the home. For more information write:

Avery Hunt
Family Computing
Scholastic, Inc.
730 Broadway
New York, N.Y. 10003

SOME OTHER MAGAZINES PARENTS MAY FIND INTERESTING OR HELPFUL ARE:

Classroom Computer News: The Magazine for Teachers and Parents
International Educations, Inc.
341 Mt. Auburn St.
Watertown, MA 02172
(617) 923-8595
\$16 per year

Electronic Education
Electronic Communications, Inc.
Suite 220
1311 Executive Center Dr.
Tallahassee, FL 32301
(904) 878-4178
\$18 per year; \$3 single copy

Electronic Learning
Scholastic, Inc.
902 Sylvan Ave.
Englewood Cliffs, N.J. 07632
\$19 per year; \$3.50 single copy

SCHOOLS AND CAMPS

CompuServe Computer Schools
Daniel A. Meeks, National Director
5000 Arlington Centre Blvd.
Columbus, OH 43220
(614) 457-8600
There are branches of the Computer School in Columbus, OH; Chicago, IL; St. Louis, MO; Dallas, TX; Atlanta, GA with programs for both children and adults.

The Computer School
21 West 86th Street
New York, N.Y. 10024
(212) 580-1335
Offers courses in computer literacy and BASIC programming for both children and adults.

Atari Computer Camps
Dept. PC
40 E. 34th Street
New York, N.Y. 10016
(800) 847-4180
in N.Y. or Canada, call collect (212) 889-5200
Offers overnight summer camps at seven sites around the U.S. for children aged 10 to 16, using Atari 800 and 1200XL computers.

National Computer Camp
P.O. Box 585
Orange, CT 06477
(203) 795-9667
Offers overnight or commuter camps at four sites around the U.S. for children age nine to 18, using Apple and TRS-80 III computers.

SOFTWARE INFORMATION

Chartrand, Marilyn J. and Constance D. Williams, *Educational Software Directory: A Subject Guide to Microcomputer Software*, 1983, Libraries Unlimited, Inc., P.O. Box 263, Littleton, CO 80160, \$22.50. A guide to educational software, distributors, and source materials both for home and school.

Classroom Computer News, 1983 *Directory of Educational Computing Resources*, Classroom

Computer News Subscription Dept., 341 Mt. Auburn St., Watertown, MA 02172, \$14.95. An information source for educational computing listing projects, user groups, publishers, associations, hardware, software, computer courses.

Ten companies which are heavily involved with children's educational software are listed below. Write to each for a free catalog or other information describing their products and the personal computers on which the specific programs run. Apple, Atari and Commodore do not directly sell software from a central location, but distribute it exclusively through dealers.

Children's Computer Workshop
1 Lincoln Plaza
New York, N.Y. 10023

A subsidiary of Children's Television Workshop, producers of "Sesame Street." Distributes software for Apple computers, especially for preschoolers and younger children. For information as to your local outlet, call (800) 538-9696; in California call (800) 662-9238. By late summer CCW will offer software for TRS-80 Color Computer and Atari 2600 VCS game machine.

Edu-Ware Services
28035 Dorothy Dr.
Agoura Hills, CA 91301
(213) 706-0661

Publishes original software for Apple II, II+, //e, IBM Personal Computer, Atari 400 and 800 computers for ages four through adult, ranging from adventure fantasies to interactive tutorials and simulations.

Krell Software Corp.
1320 Stony Brook Rd.
Stony Brook, N.Y. 11790
(516) 751-5139

Publishes software for Apple+, //e, Franklin, Commodore 64, Atari 800, TRS-80 I, II computers mainly for older children, teenagers, and adults.

Learning Co.
4370 Alpine Rd.
Portola Valley, CA 94025
(415) 851-3160

Publishes software for Apple II, II+, //e, TRS-80 Color Computer, Atari 400 and 800 computers for children aged three to 13.

Minnesota Educational Computing Consortium
2520 Broadway Dr.
Lauderdale, MN 55113
(612) 638-0627
Distributes software for Apple II, //e, Atari 400 and 800 computers for preschoolers to adults.

Radio Shack
Educational Division
1400 One Tandy Center
Fort Worth, TX 76102
(817) 390-3302

Publishes educational software for TRS-80 Color Computer, Model I, Model III for children five to 18, the majority for classroom supplement.

Scholastic Software
P.O. Box 2002
904 Sylvan Ave.
Englewood Cliffs, N.J. 07632
Distributes educational software from many manufacturers for grades 1 through 12, for Apple I, II, II+, //e, Commodore PET, TRS-80 I, Level 2, II, TI 99/4, Atari 400 and 800 computers. Also features a line of instructional games.

Spinnaker Software Corp.
215 First Street
Cambridge, MA 02142
(617) 868-4700
Publishes software for Atari 400, 800, Apple II+, Apple //e, IBM Personal Computer, Commodore 64.

Texas Instruments
c/o Consumer Relations
P.O. Box 10508, Mail Station 5828
Lubbock, TX 79408
(800) 858-4075
Publishes game-format educational software for the TI 99/4A.

Fritz Luecke, Mgr., Computer Software
Xerox Educational Publications
245 Long Hill Road
Middletown, CT 06457
(203) 347-7251
A division of the company that publishes *Weekly Reader*. Distributes software for Apple II+ and //e. Order info: (800) 852-5000.

The Rixon PC212A... The Perfect Modem For Your IBM® PC ...Only \$495

The Rixon® PC212A offers you the only 300/1200 BPS full duplex card modem with auto dial and auto answer that plugs directly into any of the IBM PC®* card slots. Because the Rixon PC212A was designed specifically for the IBM PC, it is loaded with user benefits.

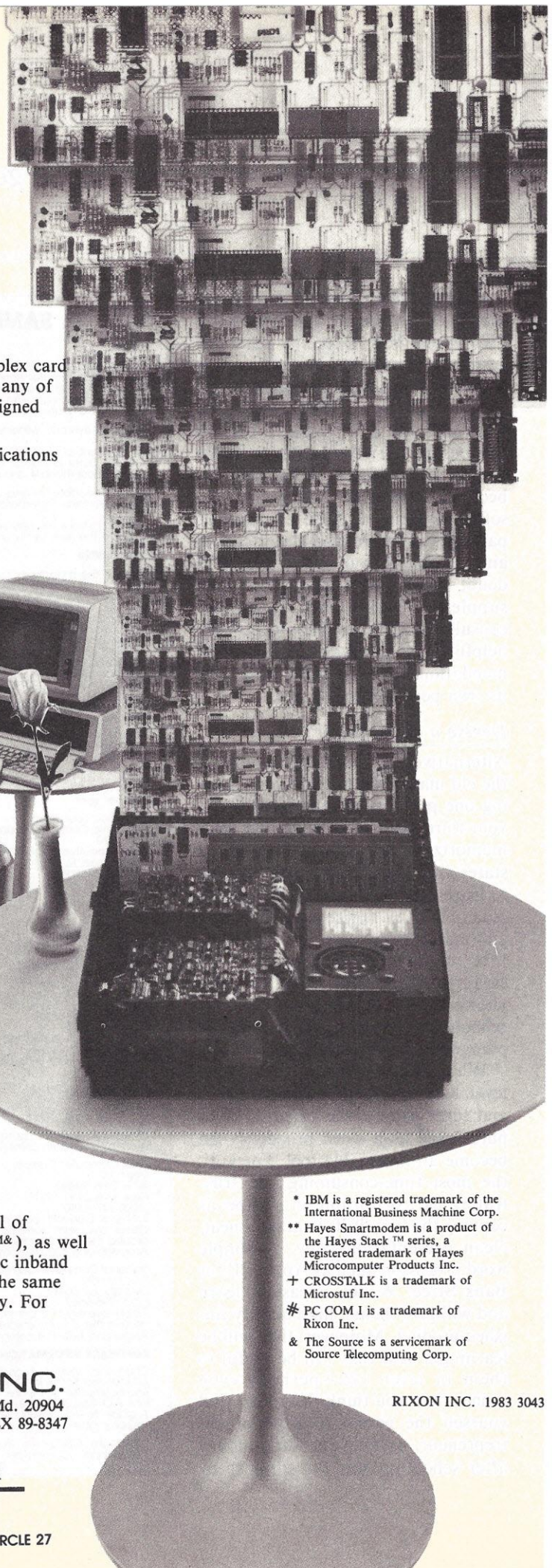
The PC212A eliminates the need for an asynchronous communications adapter card and external modem cable, this alone saves you approximately \$190. The PC212A provides an extra 25 pin EIA RS232 interface connector, a telephone jack for alternate voice operation, and a telephone line jack for connection to the dial network. Without question, the PC212A is the most user friendly, most reliable, and best performing modem for your IBM PC. An internal microprocessor allows total control, operation, and optioning of the PC212A from the keyboard. A user friendly HELP list of all interactive commands is stored in modem memory for instant screen display. Just a few of the internal features are auto/manual dialing from the keyboard, auto dial the next number if the first number is busy and instant redial once or until answered. In the event of power disruption a battery back-up protects all memory in the PC212A. In addition, the PC212A is compatible with all of the communication programs written for the Hayes Smartmodem™**such as CROSSTALK™†Also available for use with the PC212A is the Rixon PC COM I,™‡ a communications software program (Diskette) and instruction manual to enhance the capabilities of the PC212A and the IBM PC. PC COM I operates with or replaces the need for the IBM Asynchronous Communications Support Program. The program is very user friendly and provides single key stroke control of auto log on to multiple database services (such as The Source SM&), as well as log to printer, log to file transfer and flow control (automatic inband or manual control). PC COM I is only \$59.00 if purchased at the same time as the PC212A. The PC212A comes with a 2 year warranty. For more information contact your nearest computer store or Rixon direct at 800-368-2773 and ask for Jon Wilson at Ext. 472.

RIXON INC.

2120 Industrial Pky., Silver Spring, Md. 20904
301-622-2121 TWX 710-825-0071 TLX 89-8347

The Rixon PC212A Card Modem

Another Modem Good Enough To Be Called RIXON



* IBM is a registered trademark of the International Business Machine Corp.

** Hayes Smartmodem is a product of the Hayes Stack™ series, a registered trademark of Hayes Microcomputer Products Inc.

† CROSSTALK is a trademark of Microstuf Inc.

‡ PC COM I is a trademark of Rixon Inc.

& The Source is a servicemark of Source Telecomputing Corp.

Computer lessons can be as natural and simple an after-school activity as gymnastics, ballet, or music lessons.

doing word processing for hire instead of mowing lawns or babysitting.

Some word processors come with spelling checkers. Here you will have to face a personal decision only you and your child can resolve. Some parents may be afraid that dependence on a personal computer to check for spelling or grammar might encourage sloppy spelling habits—that the fourth “R” may undercut the other three. But convenience doesn’t have to mean sloppiness. A spelling checker that presents the child with several alternatives for a word could have value. Many children are unaware when they misspell a word. The type of checker that compels the child to look up the alternative words in a dictionary and to select the proper spelling for the intended meaning could turn out to be more of a coach than a crutch.

Computer schools and clubs

As your children’s knowledge and familiarity with their personal computer grow, their computing desire may change and deepen. Somewhere along the line—perhaps in junior high school—your child may begin to experiment with graphics or programming. Perhaps your daughter will become fascinated with the idea of formatting and composing camera-ready copy for the school newspaper, or your son will try some truly ambitious systematic catalog of his insect collection. Whatever the case, your child may hunger for more—with all the self-absorbed intensity that kids around age 12 can devote to a project.

When your child shows this kind of interest, one of the best things you can do is help find a personal-computer school or club. Continuing education courses in personal computing are springing up all around the country—in local high schools, colleges, and even private living rooms. The quality of these courses ranges from outstanding to very poor. Your best bet is to find out a bit about

the instructor’s background, and perhaps sit in on a class or two with your child to observe the level and method of teaching.

Some computer schools have courses designed specifically for children. One of them is The Computer School in New York City, established in 1981 by Dr. Eugene Galanter, a professor of psychology and psychophysics at Columbia University. Galanter, who based the curriculum on his experiences while introducing his three daughters to personal computing, is also the chairman of educational standards for CompuServe Corp. Galanter believes computer lessons should be as natural and simple an after-school activity as gymnastics, ballet, or music lessons. The Computer School begins teaching kids the rudiments of programming in BASIC as early as age seven, although in Galanter’s view most children don’t begin to display mature programming ability before about age 12. CompuServe itself has opened five computer schools in cities around the country.

Another source of learning is your friendly neighborhood user’s group or computer club. Computer clubs are often set up around the brands of specific machines. Users’ groups abound for owners of computers by Apple, Atari, Radio Shack, and many other popular models. Many such clubs have separate divisions for kids, where they can meet peers and swap ideas and programs. While not as formal as a course in a school, a computer club is a great way for your children to keep up with technical developments that may be important to their future, and to experiment in ways that may not have occurred to them.

A word to the wise parent


Don’t overlook periodic workshops that may be offered for kids at local high schools, colleges, or universities. Your child may also find it stimulating to attend one of the many com-

puter day camps held during the summer.

A thoughtful parent will recognize that several aspects of general parental wisdom extend to the introduction of a child to personal computing. Try to strike a comfortable balance between support and independence. In your own eagerness to give your child the best—and your own urgency about computing’s importance—don’t push too hard. Remember that even young kids have independent minds. Be sensitive to each child’s specific needs, level, and personality—and how they evolve as the child grows. Respect your children’s need to learn, experiment, and play on their own, and to satisfy their curiosity at their own speed.

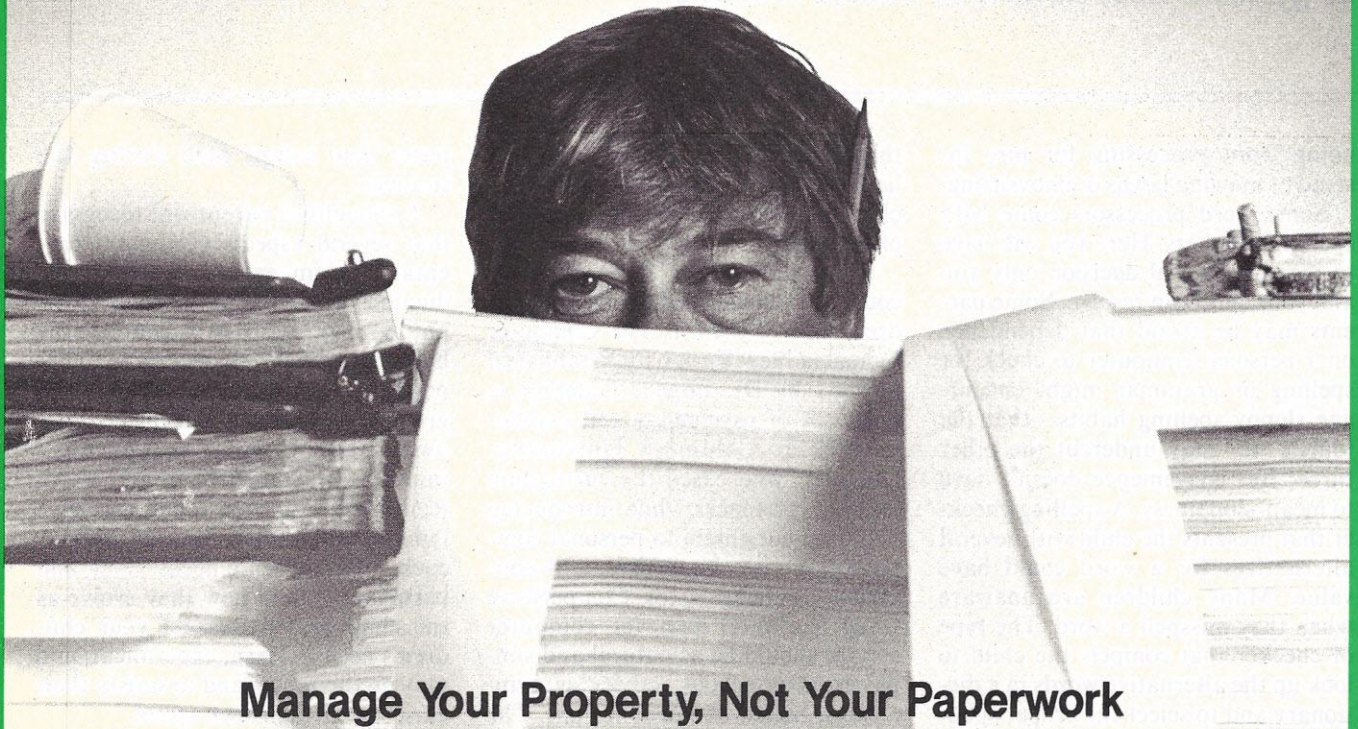
Learning respect

Second, there are values that may be important to you that you will want to convey to your children along with encouragement, skill, and advice. Two basic ones are respect for the handling of the machine itself, and respect for the privacy of other people’s disks and papers. Because of the ease in copying, altering, or wiping out a sibling’s program in a fit of pique, discuss the need for conduct of honor.

It’s clear that no matter how old your children are, there are many ways you can ensure that they get the best of personal computing. By exposing your children to new skills and knowledge, you can help them master a tool that will let them do what they want—and possibly more than they dreamed. They will be coming of age in a time when computing will rank in importance with reading, writing, and math. You can help them prepare for adulthood by offering them the opportunity to be not only computer literate, but computer fluent. Through mastery of personal computing, children can have one more strength preparing them to shape their destinies in the future they will inherit. 

The Landlord®

Property Management Software



Manage Your Property, Not Your Paperwork

Want to get out from under the paper pile? Want up-to-the-minute financial and rental information available at the touch of a finger? Meet The Landlord. With The Landlord you can do all those clerical and accounting tasks you've been doing by hand easier, faster and more accurately.

The Landlord helps you keep track of nagging details:

- Print income statements per property and owner
- Generate lease expiration lists
- Print rental statements
- Keep track of expenses per property
- Print Payables checks
- Record changes and payments for each renter
- Produce tax analysis reports for each property—adjusted to your personal situation
- Print current and upcoming vacancy lists



Now available on the Apple II® and the IBM Personal Computer, The Landlord will soon be available for CP/M® systems.

Manage any monthly income property at the touch of a finger:

- Apartments
- Offices
- Shopping Centers
- Mini-Storage Units
- Aircraft Hangars
- Marinas
- Condominiums
- Single-Family Homes
- Duplexes
- Trailer Parks

Call Systems Plus for the name of your local dealer.

Systems Plus Inc.
1120 San Antonio Road
Palo Alto, CA 94303
415 / 969-7047
TWX: 910 379-5060



The Landlord is a registered trademark of Min Microcomputer Apple II is a registered trademark of Apple Computer CP/M is a registered trademark of Digital Research

Use the POWER within your reach!

timex sinclair user

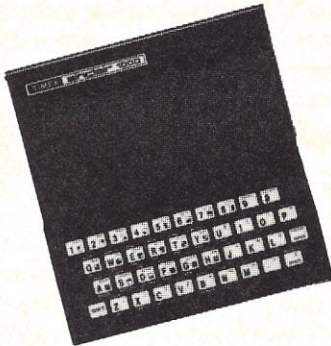
A new and unique magazine for the world's
most popular personal computer



12 issues
only \$29.95
Save \$6.00!
Plus receive
free
software
cassette!

Now that you've got a TIMEX SINCLAIR computer make sure you get the new magazine that helps you to get the most out of it... TIMEX SINCLAIR USER! And take advantage of our special bonus of a free software cassette (\$15.00 retail value) with each subscription.

TIMEX SINCLAIR USER is published monthly. It keeps you totally up-to-date. It helps you make full use of the power of your computer.



TIMEX SINCLAIR 1000: the price and technology breakthrough that finally made computers affordable.

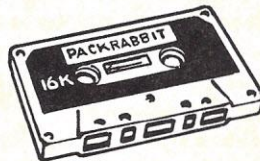
TIMEX SINCLAIR USER: the magazine that helps you use the power of this revolutionary computer.

TIMEX SINCLAIR USER covers the full spectrum of user interests. Education. Business applications. Home management. Games and family entertainment. And TIMEX SINCLAIR USER does it in a easy-to-understand style that's authoritative yet friendly.

Each issue is packed with articles and information that help owners make use of the power of their computer. News about software releases. Reviews. Hardware developments. Reader question and answer column. Eight pages of program listings in every issue. New and unique user applications. How to program. Interviews. Special money saving offers to readers.

In fact, all the latest ideas and information to ensure that new owners and expert users never tire of their computer.

FREE BONUS WITH YOUR SUBSCRIPTION



"Packrabbit"
Retail value
\$15.00

A good reason to order now! Receive a software program cassette of an exciting, new arcade game! "Packrabbit" is a regular \$15.00 retail value. Free with subscriptions for a limited time only.



For any age
or experience

Remember: the TS1000 was designed precisely for you. Whatever your age and experience in computers, TIMEX SINCLAIR USER can help you use the power of your computer.

SUBSCRIBE NOW and take advantage of our special offer. Only \$29.95 for 12 monthly issues postage paid. This represents a \$6.00 saving over regular newstand prices. And remember, you receive a **FREE BONUS** with every subscription, a "Packrabbit" software cassette (\$15.00 retail value).

To order call TOLL FREE

800-543-3000

Ask for Operator 243. In Canada call (513) 729-4300 and ask for Operator 243.

These numbers are for orders only. Have your VISA, or Mastercard card ready.

Mail to TIMEX SINCLAIR USER, 49 La Salle Avenue, Buffalo, New York, 14214

Name _____

Address _____

City _____ State _____ Zip _____

() Check () Money order. Or charge to

() Visa () Mastercard

Number _____

Expiry _____

Signature _____

timex sinclair user

() Yes, I want to subscribe to TIMEX SINCLAIR USER at the special rate of \$29.95 for 12 issues delivered to my door. In addition I understand I will receive the FREE software cassette with my first issue.

AD Code
PER5

The Well-Traveled Computer

To have a full-scale computer system as a traveling companion requires a strong dose of ingenuity.
But the rewards are worth the effort

by Jeffrey Rothfeder, Associate Editor

Your business requires months of travel, and you need a computer. The question of how to carry it with you is important. It's a serious question that many computer users—salesmen, marketers, entrepreneurs—are facing as they travel the highways to sell their products or pitch to new clients. Carrying the computer, and with it the ability to keep strings of data in simple compartments and use information well can be a crucial variable in an equation that determines success or failure in a business venture. And, because the computer maintains the channels of communications and information between those who are traveling and those at a firm's home headquarters, it can be a significant road partner.

One way to take the computer along is to buy a portable machine, and, in a sense, carry a mini-version of a computer system on the road. But, to some, this is too limited. It is too large a sacrifice to give up the huge data vaults that can reside on hard-disk drives or to do without the letter-quality printers or the 80-column, 12-inch monitors offered only by full-size systems.

To continue to do full-scale computing while traveling is difficult. But at least one personal-computer owner has mastered the problem. He furthered his mobility while losing nothing in computing power.

Raymond Weiss, an agent who represents over 40 music acts that vary from the String Orchestra of Zurich to the New York Jazz Quartet, is on the road at least three months a year. His agency, Raymond Weiss Artist Management, Inc., is based in New York City, but he can be found more often than not in some remote location like Memphis, Duluth, or Bakersfield. His wanderlust is fueled by the necessity to either take care of his clients as they tour the country or to hobnob with chamber music societies, symphony hall owners, and teams of impresarios in a business where shoring up contacts and sponsors is a critical necessity.

Early on, Weiss understood the value that computerization could bring to him in terms of improving his skill and efficiency as an agent. He had met many other small businessmen who had bought computers and solved bookkeeping and data management problems that had plagued them for years. But because he was on the road so often, purchasing a computer seemed a wasteful expense. One option he considered was setting up a computer in his New York office and having his staff use the machine, following instructions he gave over the telephone.

This, however, made the computer a distant object for him—and an impersonal one at that. He felt that if he couldn't have a computer with him at

all times, he wouldn't be getting his money's worth from the machine. The expenditure probably wouldn't be worth it, because the main reason Weiss wanted a computer was for personal use—to be able to do on-the-spot correspondence, keep track of tour accounting, and add information to his growing data base.

Weiss's choices were limited to either purchasing a portable computer without a letter-quality printer and hard-disk drive and modeming correspondence and bookkeeping data to the New York office, or setting up a completely portable personal-computer system. He went for the total system. But in making that choice, another decision was made by default. He would have to retrofit his 20-foot motor home which he often used as an office on the road to enable it to haul and store his computer system.

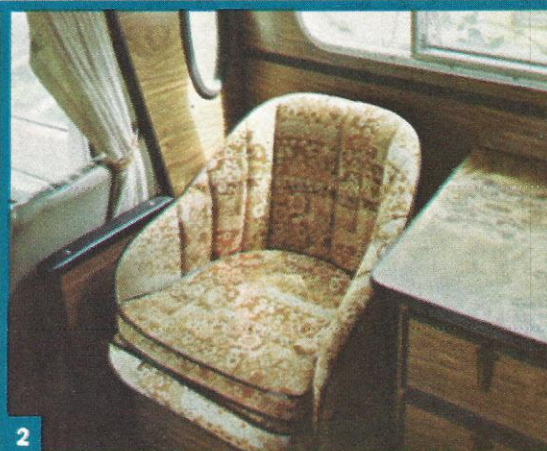
Mobile, but permanent

Though the computer would be mobile, it would have to have the advantages of permanence. Carrying 60 pounds of computer hardware into and out of hotels and motels was a back-breaking and unfeasible option. As it turned out Weiss's decision led to the production of one of the first full-scale computer systems that would log 40,000 miles a year. He is now able to remain in constant touch with the activities of his New York

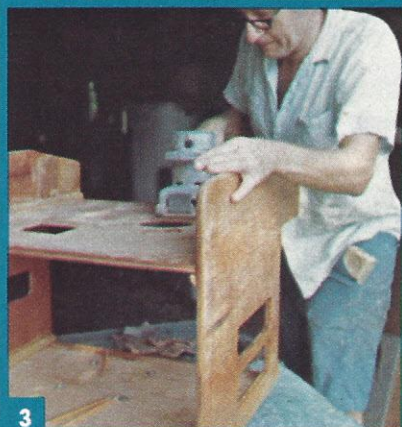
A Whole New Cast



1



2



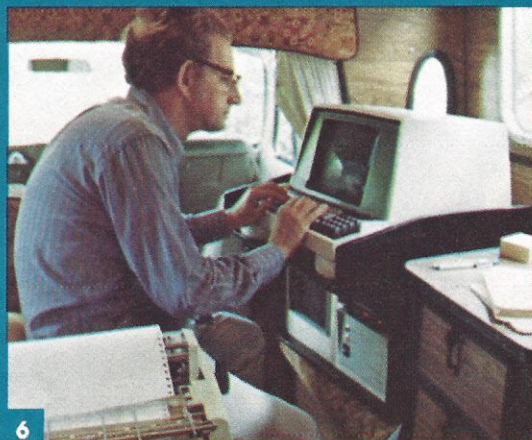
3



4



5



6



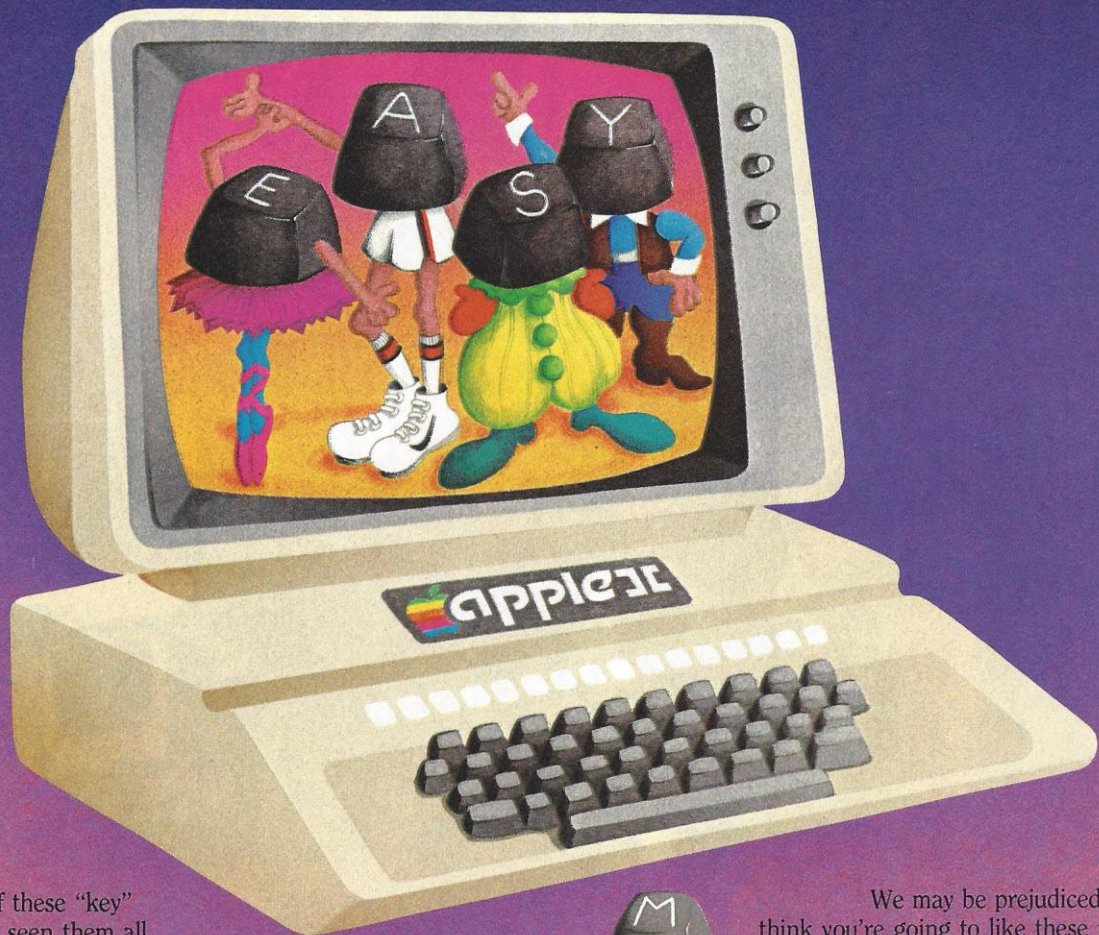
7

HITTING THE ROAD . . .

1. Raymond Weiss's mobile home became a computerized office.
2. He replaced a chair, behind the passenger, with a workstation.
3. Weiss built the computer cabinet using plywood and epoxy joints.
4. The finished cabinet readied for computer installation.
5. The computer floating on foam rubber to withstand shocks.
6. Weiss keeps a daily tour audit on his road computer.
7. Weiss and three Kodaly quartet members go over the books.

photos by Raymond Weiss

The Enhancer II™ Proudly Presents A Whole New Cast of "Key" Characters!



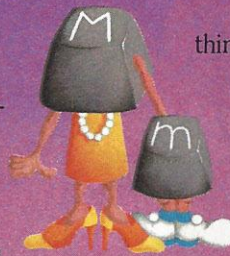
Recognize some of these "key" characters? You've seen them all before on your Apple® II screen, but now the Enhancer II has given them all new identities!

The Enhancer II uniquely gives your Apple II user-definable keys. So you can define any key to become what you want it to be. That means phrases, paragraphs or commands that you use frequently (up to 510 characters!) can be remembered by the Enhancer II and then called up at the touch of a single key.

Besides that, the Enhancer II gives your Apple II typewriter mode, with each key assuming the

identity of a conventional typewriter key. Not only will you recognize all the characters; you'll positively rejoice at having upper and lowercase letters, auto repeat, shift and shift lock again! The Enhancer II also has a type-ahead buffer of 128 characters, so you can keep sending messages to your Apple II even while it's busy with something else.

And if you want to meet even more new characters, the optional Function Strip™ will introduce you to 16 brand-new keys across the top of your keyboard which are yours alone to define. (These characters will never get mixed up with characters from the keyboard!)



We may be prejudiced, but we think you're going to like these new "key" characters from Enhancer II. In fact, we'll bet that once you've seen them perform, they'll become the stars of your screen.

Suggested retail prices:
Enhancer II, \$149
Function Strip, \$79
Combined Package, \$215



897 NW Grant • Corvallis, OR 97330
(503) 758-0521

The Enhancer II and Function Strip can be used with any Apple with a keyboard encoder board.

Apple and the Apple logo are registered trademarks of Apple Computer, Inc.



He made a foam rubber mounting device. The computer seemed to be floating on soft cushions.

**PROFESSIONAL/
MANAGERIAL**

staff while he travels. Information flows smoothly between the highway and the office, so Weiss always has facts or statistics at his fingertips. And perhaps, most important, he has complete use of a personal computer, which has made him a more efficient—and sought-after—agent.

In Weiss's case buying the computer was the easy part; it was setting up the machine that posed the most difficulties. Having, in early 1982, just produced a highly successful tour with the Zagreb Philharmonic of Yugoslavia, Weiss had come into the money necessary to purchase the hardware he needed. He asked Rosemary Gabler, a developer on the Visi-Link software project for VisiCorp, and an acquaintance, to lead him through his hardware and software buy. Word processing—with a touch of data-base management—and accounting seemed to be his most pressing needs. So Gabler recommended buying the Memowrite word processor and the ExecuPlan spreadsheet for bookkeeping and running these packages on Vector Graphic computers.

The reason for Gabler's recommendations were simple—she was familiar with this hardware and software. Purchasing a computer is often, Weiss found out, an emotional buy. Weiss bought a Vector Graphic 5005—a multiuser system—for his New York office and a Vector Graphic 3005 for his mobile office. Both computers have 5Mb hard disk drives, floppy disk drives, and NEC Spinwriter printers. The entire system cost close to \$25,000.

Special considerations

The equipment purchase went without a hitch. But now Weiss had to face the question of what special considerations are involved with hooking up a computer in a mobile home? "There are two main problems you come up against immediately," Weiss says. "One is 'What are you going to use for a power source?'

especially if you want to avoid using a noisy generator, which I did. And the other problem is how to overcome the severe damage that travel vibration or tires bumping in and out of potholes can do to disk drives."

To keep the computer and its peripherals steady, Weiss leaned on some techniques he learned while rebuilding an old sailboat two years earlier using plywood and epoxy glue. He built a mounting device that secured the components with clamps and a tight fit, while at the same time rectangles of foam rubber ensured that whatever the conditions of the road, the computer hardware would seem to be floating on soft cushions.

The power supply was a far more difficult obstacle to overcome. Weiss contacted people in the electronics field who could shed some light on how to run a computer off a 12-volt automobile battery. He was directed to Tony Wiseman at the Portable Battery Division of SAFT America, Inc., who custom fashioned for him a power supply based on an inverter that switches the 12-volts up to 110-volts, enough to power the computer.

Weiss took the completed system, then, and secured it in the corner right behind the passenger's chair where a seat used to be. As Weiss puts it, that is truly when his personal roadshow began. Installing the computer in the mobile home took from May to October of last year, but it was time well spent. During that period he developed ways he would use the system while traveling, based on his experiences with the Vector Graphic in his New York office.

Perhaps the most important achievement having a Vector Graphic on the road has given him is the ability to travel with his clients as they tour. That allows him to keep careful watch on their bookkeeping records and cash balance as they make their way across the country. For many of his clients this is not a frivolous matter. "Especially if you're

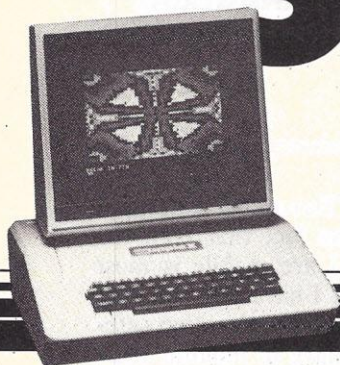
dealing with European clients," Weiss says, "the fact that both the computer and I are mobile is most important. First I have to make sure they pass through immigration safely, and then I have to monitor their expenditures and how much they earn while in the States carefully. Because a month later, when they're ready to leave the United States, the IRS demands an individual statement of earnings for each ensemble member. Without this they won't get sailing clearance. They won't be able to leave the country."

To keep his clients' ledgers Weiss uses a spreadsheet he drew up on ExecuPlan and which lists ensemble expenditures like groceries, hotels, traveling and entertainment, and ensemble income from artist bonuses, salaries, and percentage of house gate. "I can modify the information on this spreadsheet as it changes on a daily basis if I'm traveling with the group," Weiss adds. "Then when the tour is over, I let ExecuPlan calculate the bottom line—how much the group as a whole earned. And if it was a trio performing, for instance, I divide the entire spreadsheet into thirds and print out a separate income statement for each ensemble member. This way the group doesn't have any problems with American tax authorities when they leave."

In similar fashion, traveling with the computer allows Weiss to keep up with correspondence and remain in touch with people he needs to reach while he's on the road. Keeping abreast of the activities of national sponsors is closely tied to planning future bookings. And because he has his computer with him while he's traveling with one group, he can continue to organize upcoming tours. This type of work, otherwise, would have to be left to the home office staff, which in some cases, does not have the breadth of influence in the music community that Weiss has.

For this work, he uses Memowrite from Vector Graphic, which in some

SAVE BIG WITH PALOMAR!



Let our experts help you configure your system and save even more!
Depend on Palomar for great backup, too. (1) Expert technical advice. (2) Fast response on orders. (3) In-house service repairs. (4) Guaranteed satisfaction.



APPLE SYSTEMS SPECIAL

Apple-Compatible 48K Computer with TEAC Super 5 Disk Drive and Controller,
BMC 12" Green Screen Monitor ... **NOW—\$1,255⁰⁰**

Same system with a 64K Franklin Ace 1000 \$1525.00
Same system with a 48K Apple II Plus \$1595.00

PERSONAL COMPUTERS

ALTOS
ACS 8000-2 3199.00
ACS 8000-15 4399.00

BASIS
108-0003 (64K) 1895.00
108-0004 (128K) 1995.00

CHAMELEON
IBM-Compatible 1995.00

IBM
IBM PC CALL

MORROW
Micro Decision with Terminal & 1 Drive 1790.00
Micro Decision with Terminal & 2 Drives 2140.00

KAYCOMP
Kaypro Portable, Includes \$250
Extras 1795.00

OSBORNE
Osborne I Portable, Includes \$200
Extras 1795.00
With Double Density Drives 1995.00

SYSCOM
Syscom 48K, Apple Compatible 799.00

TELEVIDEO
TS 802 3119.00
TS 806 5735.00
TS 816 10365.00

VICTOR
9000 (SS) 2 Single-sided Drives 3495.00

APPLE HARDWARE

ALS Z Card 159.00
CCS IEEE Card 175.00
EDP AC Surge Protector 49.00
Hayes Micromodem II 299.00
Microbuffer II 16K 219.00
Microtek 16K Ram Card 79.00
Microtek Parallel Printer Card 69.00
Microtek Graphics Card—(32K) 235.00
Microtek Magnum 80—Column Card 209.00
M & R Super Fan 40.00
Nikrom Master Diagnostics 45.00
Numeric Key Pad 150.00

IBM HARDWARE

BMC Color Composite Monitor
with Sound 399.00
Computer Peripherals 64K Ram 199.00
Computer Peripherals I/O Printer
Interface (4 Ports) 159.00
Computer Peripherals Octopus
Printer Buffer 165.00
Corona 5MB Winchester CALL
Micro Buffer In Line, (32K) 259.00
MPI 320K Drive 299.00
Ram Plus Quad Board 449.00
TG Joysticks 49.00

*Palomar features a complete selection of
Apple and IBM Software. Call for details.*

DISK DRIVES

Corona 10MB Winchester CALL
Disk II With Controller Card CALL
Media Distributing 11 Mb Winchester
Subsystem 2595.00
Media Distributing 22 Mb Winchester
Subsystem 3495.00
Microsci A35 375.00
Microsci Controller Card 99.00

Rana Disk Drive 319.00
Rana Controller 109.00
Super 5 Disc Drive 299.00
Super 5 Controller Card 89.00
Super 5 Double-sided
Disk Drive 429.00
Super 5 Controller Card for
Double-sided Disk Drive 109.00

MONITORS

BMC
BM-12AU 12" Green 89.00
BM-12 EUN 12" Green 149.00
BM-1401 RGB with Card
and/or Cable 399.00
BM-AU919U Color, Composite
Sound 399.00
BM-AU9191U RGB for IBM-PC 759.00

COMREX
CR 5500-12" Green 155.00
CR 6500-13" Composite 315.00
CR 6600-13" RGB 429.00

AMDEK
Video 300-12" Green 165.00
Color I -13" Color Composite 349.00

MODEMS

NOVATION
CAT (Acoustic) 145.00
D-CAT 159.00
J-CAT 139.00
Smart CAT (300) 215.00

UDS
103 LP Direct 175.00
103 JLP Auto Answer 209.00
202 SLP 1200 BAUD 255.00
212 LP 469.00

PRINTERS

COMREX
Comriter CR-1C CALL
Tractor Feed 89.00

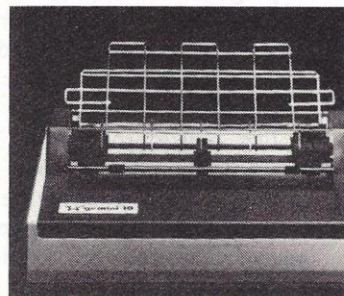
EPSON
ASAP 2K Serial 59.00
Comrex 4K Serial Buffer 139.00
Microbuffer-16K Parallel 139.00
Microbuffer-8K Serial 139.00

SILVER REED
EXP 550 Serial/Parallel Interface 695.00

STAR MICRONICS
Gemini 10 CALL
Gemini 15 CALL

TEC
PMC 8510 Parallel 465.00
PMC 8510 Serial 585.00
ITOH 8510-A Parallel 469.00
ITOH 8510-A Serial 619.00
ITOH 1550 Parallel 750.00
ITOH 1550 Serial 789.00

OKIDATA
Microline 82-A 489.00
Microline 83-A 689.00
Microline 84-S 1199.00
Microline 84-P 1059.00
2K Parallel Interface 129.00



**ORDER TOLL-FREE! Call
800-237-3333**

In California call 800-338-5555

Telex 697120-150



TERMS OF SALE: Cash, Check, money order, bank wire transfer, credit card, or purchase orders from qualified firms and institutions. Please include telephone number with order and expiration date on credit card orders. California residents add 6% sales tax. Advertised prices are for prepaid orders F.O.B. shipping point. Add 3% or \$3.00 minimum for shipping in the U.S. Pricing and availability subject to change without notice. Address written orders to:

910-105 W. San Marcos Blvd., San Marcos, CA 92069

Many items are not listed. Please call our 800 number
if you don't see what you're looking for.

PALOMAR
COMPUTER PRODUCTS

*With alligator clips attached
to pay phones, Weiss modems
New York at 5 p.m. each evening.*

**PROFESSIONAL/
MANAGERIAL**

important ways is part word processor and part data-base manager. It has room for up to 40 clarifiers—or search words—that allow him to call up groups of information using key words. For instance, if the Ensemble Instrumental de France is already booked to tour over the next two months, but a weekend cancellation in Hartford, Conn. forces Weiss to look for a vacant hall on the East Coast, he can pull from Memowrite the original form letter he sent describing the chamber orchestra and the dates of its planned tour. Then he keys in the command to run off a mailing list that contains all the sponsors in Ohio, Pennsylvania, New Jersey, and Massachusetts that hold weekend concerts in halls capable of seating 2000 or more people. With this in hand, he can send a mailing to these sponsors by the end of the day and not lose any time in rebooking his ensemble.

Ritualized communications

Weiss clearly prizes the convenience of the computer as a road companion. In all respects it's made his necessary travel time more productive. He is especially pleased with how the computer allows him to keep in touch with the work being done at his New York office. Communications between the traveling side of Raymond Weiss Artist Management and the home office are almost ritualized.

Every evening at 5 p.m., Weiss prepares a package to be sent to New York by computer that contains jottings made during the day. It is usually a report about four screens long that includes the status of anything he's been working on while traveling, a list of what he would like done in the home office during the next day, ideas for certain staff members to consider, and correspondence that needs additional information before it is mailed out. The complete report is sent via modem.

"So at 5 p.m. everyone knows what has happened on the road," Weiss

says, "and they can respond with information about what has been happening at the New York office. We can transmit information about what needs to be done or thought about and spell it out concretely, without wasting money and time thinking over the long distance lines. The computer also affords us as close to perfect accuracy as we can expect to get. Critical parts of letters can be phrased exactly as they need to be or reviewed and revised to be sure they make exactly the point that needs to be made."

At least tactically and physically, making these daily data communications calls from the road is probably Weiss's most difficult accomplishment. He uses a Smartmodem from Hayes, running at 1200 baud—Weiss, who is ever vigilant about his business' pennies, says simply that "a 1200-baud transmission costs one-quarter the amount of a 300-baud transmission, because the connect period is one-fourth the time." But making the connection while traveling is sticky.

The communications software that Weiss uses most is Trans 4 and Rec 4 from Byron Software Telecommunications. After he boots up the software, he ties the Smartmodem into a pay phone—or a friend's phone—by using long wires tipped on the phone end with alligator clips. He gives the modem the telephone number to call, tells it to dial, but instructs it to wait one and one-half minutes before attempting to send the file. (He figures that it will take just a little less than that to give his credit card information to the operator.)

"After the modem finishes dialing the number and the operator comes on the line, I quickly have to tell the operator to not let this call go through," Weiss says. "I have to explain that it's a data transmission call and if she lets it go through while I'm giving my credit card number all she will hear is that high-pitched tone of


the computer at the other end of the connection. And she'll probably hang up. Explaining this type of phone call to operators in some of the backwoods of this country requires the patience of a saint."

Still, most of the computer connections are made with little trouble. And one of the beauties of Trans 4 and Rec 4, Weiss says, is that after he sends his file to New York, he can receive a file in return without losing the telephone carrier line. This is not the case with most of the other data communications software packages. When the transmission between New York and the mobile office have been transmitted, in many ways, the firm's work day is over. But the staff and Weiss are one step ahead. Their computer-carried missives have already laid out the next day's work.

Breaking through barriers

Raymond Weiss feels the sense of accomplishment that comes from breaking through barriers. He is one of the few computer users in the country who is able to travel with his entire computer system and not give up letter quality correspondence and 5Mb memory just because his work forces him to spend months on the road. His latest brochure proclaims that "because of the acquisition of a highly sophisticated Vector Graphic computer system, we are now in a much better position to serve both our artists and our clients more effectively."

To live up to that statement, Weiss is setting up a system where concert sponsors can receive information via personal computer about any of his artists and program updates about their tours. His expectations have been aroused. Weiss feels that he is leading concert management out of a staid past into a high-tech present.

"Trying to run an artist management company today without a computer," he says, "is like trying to plow a 40-acre field with a one-horse plow." 

Electronic Communications Made simple for The Apple®:

Transpaks™ From SSM.

SSM Transpaks give you all the modem hardware and Transend™ software you need to connect your Apple II/Ie® to the world of electronic communications.

Public information services. Transend Software lets your Apple do the walking.

Transpak 1 connects your Apple to other Apples, to mainframe systems, or to public information networks. In fact, all Transpaks include valuable subscription offers to three time-saving information services: THE SOURCE™, Dow Jones News/Retrieval®, and DIALOG's Knowledge Index™.

THE SOURCE provides instant access to SourceMail business and UPI world news, stock reports; government activity, and private newsletters—even shopping at discount prices.

Dow Jones News/Retrieval keeps you current with the latest corporate news, stock prices, sports statistics, economic surveys, and exclusive news and information from *The Wall Street Journal*, *Baron's*, and *The Dow Jones News Service*.

The Knowledge Index instantly locates articles, reports or books from an electronic library of over 10,000 journals. You can request information on practically any topic, and in seconds the Knowledge Index will direct you to pertinent articles.

SSM Transpaks will help you do more:

Electronic mail. Transend software gets it there in seconds.

Transpak 2 insures that information you exchange with other Apples will arrive intact. You can send and receive important documents or files of any size over any distance with complete confidence.

With Transpak 3 and a clock card, your unattended Apple can send electronic mail *automatically* to up to 100 other unattended Apples anywhere in the world, at any hour. You'll save time and phone costs by exchanging information at night when rates are lowest.

Each Transpak includes the SSM 300-baud Apple-Modem Card™ with convenient auto-dial/auto-answer capabilities. For the fastest communication available on the Apple, SSM's Transpak 2+ or Transpak 3+ features the SSM TransModem 1200—a 300/1200-baud stand-alone modem.



Choose your Transpak and get started today.

Each Transpak includes all the communications software and hardware you need in one simple package. Your SSM dealer can help you select the Transpak that's right for you. SSM guarantees your satisfaction or your money back.

	Software	Hardware
Transpak 1	Transend 1 Terminal Emulator	300-baud Modem Card
Transpak 2	Transend 2 Electronic File Transfer	300-baud Modem Card
Transpak 3	Transend 3 Unattended Electronic Mail	300-baud Modem Card
Transpak 2+	Transend 2	TransModem 1200 with serial interface and cable
Transpak 3+	Transend 3	TransModem 1200 with serial interface and cable

Apple and AppleII/Ie are registered trademarks of Apple Computer Corporation. Transend, Transpak, AppleModem and TransModem 1200 are trademarks of SSM Microcomputer Products, Inc. THE SOURCE is a service mark of Source Telecomputing Corporation, a subsidiary of The Reader's Digest Association, Inc. Dow Jones News/Retrieval is a registered trademark of Dow Jones & Company, Inc. Knowledge Index is a service mark of DIALOG Information Services.



Transend it.

SSM Microcomputer Products Inc.
2190 Paragon Drive, San Jose, CA 95131
408/946-7400

Radio Shack Announces a NEW TRS-80[®] Computer...With the Lowest Price Ever!



Pocket Computer
Model PC-4

69⁹⁵
26-3650

PC-4 Cassette
Interface

39⁹⁵
26-3651

PC-4 Printer

79⁹⁵
26-3652

Our Lowest-Priced Pocket Computer Ever!

The new PC-4 is ideal for students, mathematicians and engineers because of its programming versatility, yet it measures only $\frac{3}{8} \times 6\frac{1}{2} \times 2\frac{3}{4}$ "—slim enough to fit into pocket or purse. And with its matching components, it becomes a complete, portable computing system that's ready to go where you go.

Programmable in BASIC. The PC-4 goes beyond mere programmable calculators because it features the most popular computer language—BASIC. Common commands like GOSUB, LIST, STEP, and up to 13 others can be entered just by pressing two keys. Numeric accuracy is 10 digits. String variables can be up to 30 characters in length, and string commands include LEN, MID and VAL. There's a 12-character alphanumeric display, yet program lines can be up to 62 characters long.

Use It As a Calculator, Too. Built-in math functions include trig and inverse trig, radians and gradians, log, exponent, square root, angular conversions and absolute values.

How Is It Possible? The custom CMOS VSLI chip is the answer. It lets you maintain up to ten short programs in its 544-step memory—or combine programming area for longer programs. Each program can be identified and recalled with a single-key label.

Expandable, Too. For additional program and data space, get a 1K memory module. Add the cassette interface to store and load programs at 300 baud using an optional cassette recorder. Add the PC-4 printer and print 20 characters per line at 60 lines per minute.

Pick One Up Today! The super-light (just 4 oz.!) TRS-80 PC-4 is now at the Radio Shack Computer Center, store or participating dealer nearest you.

Radio Shack[®]

The biggest name in little computers[™]
A DIVISION OF TANDY CORPORATION

Send me the New RSC-9 Computer Catalog!

Mail To: Radio Shack, Dept. 83-A-219
300 One Tandy Center, Fort Worth, Texas 76102

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____

Retail prices may vary at individual stores and dealers.
Some items may require special order.

Stretching Your Software

There may be more potential in your software
than the package proclaims

by David Gabel, Senior Editor

One of the great things about personal computing is its versatility. We're all familiar with the wide range of functions they can perform—from word processing to spreadsheets to filing to telecommunications. Conventional wisdom says all you need to do is buy a program for a particular application and the program will do all the rest.

The really interesting thing, though, is that you might not need a new program in order to use your personal computer for a new application. Sometimes, if you put your mind to it, you can do things with your personal computer and software you might never have thought possible. How about using your word processor as a communications program? Or using a spreadsheet as a word processor, or a database manager as a general accounting package? Or a spreadsheet package to do accounts?

It's all possible, because the capability for modification is inherent in general-purpose packages. You may even find using a package for a purpose other than the one it was intended for is easier than using a package designed specifically for that application. This can solve some other problems too. For example, you might not want to spend the money for an extra package. Or maybe nothing you've seen fills the bill.

We at *Personal Computing* discovered the package-stretching phe-

nomenon when we were trying to find a way to get prepared files into our company's typesetting computer. That computer had a modem so we figured we could send our files into it by telephone. There were a lot of problems, but we did find out that a word processor will send text over the phone lines. All you need is an acoustic modem. The procedure works like this.

Prepare your document and get ready to transmit it. In our case, that meant getting the text we wanted to transmit into the word processor's text buffer. Then call the receiving computer, and place the phone into the acoustic coupler when you hear the tone from the receiving unit. Tell the word processor to print the document.

Here's the interesting part. The computer will print when you tell it to. All it needs to know is the location of the printer. If a modem happens to be connected to the place where you tell your computer a printer is, the computer happily "prints" on the modem. The modem sends information to the other end of the phone line where the other computer gathers the data and does with it whatever it is supposed to do.

Obviously, you need a modem operating in originate mode so it knows to send its carrier signal over the line. It's easier to do this with an acoustic coupler than with a direct-

connect modem, although it does work with some word processors coupled with specific modems. There you have to get out of the word processor, activate the modem, get back into the word processor, and then "save" the file to the modem. With an acoustic modem, some of these gyrations are avoided.

Just a little more reach

This is a simple example of stretch computing. Any time you do something with a computer and associated program that's beyond the original scope of the program, you're doing stretch computing. It may be fairly difficult, or it may be very simple—just a new twist no one else has thought of.

Take Judith Schwartz, for example, who works in the sales department at Apple Computer. We would expect she has access to almost any kind of word-processing program that runs on Apple computers. Yet, for one special application, her department uses VisiCalc as a word processor.

"We prepare demonstration and training tools," says Schwartz. "We need to get information into three columns on an 11-inch sheet of paper. We couldn't find a word processor which would cover that width of paper and still allow us to use the columnar format easily. So we tried VisiCalc."



Illustration by Dave Pauley

"We set up the program with columns 30 characters wide. In the first column, we have to use two adjacent cells because the information is so wide. So we have to skip to the adjacent data cell. If we had Advanced VisiCalc, which lets you use variable column widths, we wouldn't have that problem."

Jeanne DuPreau is one of the people who does the actual data input. "We found it's really easy to use the program this way," she says. "When we used a word processor, we couldn't use the columns easily and still go past 80 columns. When you delete something on a line, the line fills in for the delete characters. That messes up column alignment, and then you have to go back and realign everything. VisiCalc doesn't do that, so it's a lot easier. Also, some of the columns have to be right justified, and some left justified. The format command lets you do that easily."

Adds Sue Crissman, another training-aids writer, "Skipping to adjacent cells seems like a problem, but it really isn't. We just use the right-arrow key. Once you get used to it, it's much faster than using a word processor. And the printing is another advantage. We can print one column at a time."

"People are horrified when we say we use VisiCalc as a word processor," says Schwartz, "but we found it works just fine for this application. Lots of people can benefit from simple things like this."

Accounting made simple

That doesn't sound like a very tough thing to do. The stretch in this instance came in breaking the mind set. You want to do word processing so you buy a word processor. Well, maybe not.

Do you need an accounting package to do accounting on your personal computer? Maybe not. Marti Manson, the director of the San Jose (Calif.) Museum of Art, found out she didn't need one. She raised

stretch computing to new heights by combining an Apple /// with Apple Writer III, VisiCalc, QuickFile, and Business Graphics to design a business-accounting system for the museum.

"We're a non-profit museum," says Manson, "so we really can't afford to spend a lot of money on computer equipment. We were fortunate to have Apple donate an Apple II, and then an Apple /// and the software. They have made us a lot more efficient."

Rose Pantoja is the museum's computer expert. "We had to adapt the Apple equipment to fit our needs," she says. "For example, we use VisiCalc for all our financial work, like accounts payable and receivable. We can do anything with this program that you can do with paper and data arranged in columns and rows. In the past, it took our bookkeeper three days to generate a set of financial reports. Now she can do it in about half an hour."

Pantoja says the museum bookstore uses VisiCalc to do its inventory. Items sold are posted into another template and the program, using its recalculating capability, automatically deducts the amount sold from the total on hand, generating a new total. This procedure makes it easy to tell when a new order has to be placed. The inventory template is one of several the museum is using right now. Others include accounts payable, accounts receivable, budget, monthly balance sheet, monthly receipts, and monthly disbursements. But that's not all the museum staff has been able to do with its small setup.

"We use the Apple Writer program to do our annual reports," says Pantoja. "The nice thing about it is that we can merge files from our VisiCalc and QuickFile into the word processor. We keep our inventory of display items on QuickFile, for example, and it's easy to incorporate this inventory into a report using the

file merge capability. We can put our budget figures there, too."

The museum staff uses QuickFile for normal data-base applications, like keeping track of the museum's membership file, and the people who attend its art classes. Form letters are generated from these files when it's time to renew memberships, or when new people join and are sent notes of thanks. When the museum puts on a special show, for which people donate items to be put on display, QuickFile generates the wall label—a small card placed near the item showing the size of the painting, its artist, and owner.

Stretch computing doesn't have to require a lot of programming. As we've seen, it can be as easy as thinking of new and innovative ways to use something you already have. But it isn't limited to that.

Stretching data-base managers

Bruce Hutcheon is a musician whose interest in computers grew out of his experience with synthesizers and computer-generated music. Now he's the vice president of programming for a small consulting company which develops communications systems for banks. These systems are minicomputer-based, so the firm, New York-based Synergistic Communications, had no experience with personal computers until recently, when Hutcheon started talking to his father who's in the propane business.

"My dad works for Burn Well Gas in upstate New York," says Hutcheon. "He's the plant manager of one of several affiliated plants spread over a large geographic area. They thought they should computerize their operation, and went to several traditional manufacturers of distributed systems. IBM talked to them about a System 34 which would have cost them about \$175,000 with all the hardware. They could have justified this cost, but I just thought there was a better way, so I got involved."

After investigating and nego-

*Stretch computing can be
as easy as thinking of
new ways to use what you have.*

tiating with the gas company, Hutcheon's company agreed on a price to set up a whole system using IBM Personal Computers. "The system IBM had proposed involved using a computer at a central location, and hooking up terminals at the various plants through leased lines. I thought it could be done with a stand-alone system at each plant. The more I thought about it, the more I got sucked into doing the job.

"Once I had decided on the hardware configuration, which would include a Corvus hard disk with either the multiplexer or OmniNet, I had to decide which language to use. It was pretty much a toss-up between languages—we looked at BASIC, Pascal, even COBOL. Then someone showed me what could be done with dBASE II. I went into a Computerland (in Brussels, as it happens—at the time Hutcheon was shuttling between Europe and San Juan, Puerto Rico working on an international private network for a bank), pulled a dBASE II package off the shelf and sat down with it for an afternoon." That's when Hutcheon decided to use this program as the basis for the system.

A sophisticated data-base management system dBASE II runs on CP/M systems and on the IBM Personal Computer under MS-DOS. It includes a kind of programming language which allows the user to get at his data in a variety of ways. The programming capability allows the user to generate automatic input and output structures which would otherwise have to be done interactively—manually specifying search keys to search through the data base, for example.

When Hutcheon decided to use dBASE II it wasn't yet available for the IBM, so he had to get the Zedex Baby Blue CPU, a co-microprocessor for the computer which included a Z80 microprocessor and 64k of RAM.

Using dBASE II Hutcheon devel-

USING VISICALC AS A WORD PROCESSOR

We were so intrigued with Jeanne DuPreau's description of using VisiCalc as a word processor we decided to give it a try. We can report that it works, and that it does give some formatting capabilities which are difficult to get with a word-processing program.

The printout shown here is a modification of the instructions Jeanne wrote for her co-workers at Apple. Those instructions were very specific to her application, while ours are of a more general nature.

The only thing we don't say in our instructions is how you would set up the printer interface for printing your files. In this example, we used a Mountain Computer CPS Multi-function card as our parallel interface with an Epson MX-80 printer assign-

ed to a phantom slot #1 in an Apple II Plus. (That's why the printer output is all uppercase.) DuPreau and her counterparts use Apple ///s, with 80-column, lowercase displays.

In preparing this printout we found we had to get into the SETUP program for the Mountain card to reset the line-feed and the line-length parameters. Otherwise, that card just ignores all instructions VisiCalc sends for printing. Then we were able to use the setup string in the VisiCalc PRINT command to make the MX-80 print 132 columns, in condensed-print format.

If you have a word-processing application which requires the use of a columnar format, this program works. Presumably, it will work with any spreadsheet program.

THIS IS A DEMONSTRATION OF USING VISICALC AS A WORD PROCESSOR

VISICALC ALLOWS SOME FORMATTING
BENEFITS NOT NORMALLY AVAILABLE.

FIRST YOU HAVE TO BOOT
VISICALC

PR#6 (OR SLOT DRIVE IS IN)

NEXT YOU GET TO THE CELL YOU
WANT

CURSOR-CONTROL KEYS

SET YOUR COLUMN WIDTH

/G, C, (COLUMN WIDTH),
RETURN

TO PRINT, ACCESS THE PRINT
COMMAND, LIKE THIS

/PP, LOWER RIGHT CELL TO
PRINTRETURN OR, /PP, "C180N OR
OTHER SETUP STRING TO SUPPRESS
LINE FEEDS OR SET LINE LENGTH
THEN LOWER RIGHT CELL TO
PRINTRETURN

YOU CAN DO MORE!
YOU CAN MAKE
COPY
RIGHT-JUSTIFIED

USING THE / F (R OR
L) COMMANDS FOR
JUSTIFICATION

OR, YOU CAN LEFT
JUSTIFY IF YOU WANT
TO, FOR SPECIAL
FORMAT EFFECTS.

oped a general accounting system for the propane plants that are affiliated with Burn Well. The system is now in use at one of the plants, where it's been running parallel with the plant's manual system, just to make sure everything is OK before turning over operations to the computer. The program is a complete accounting system—it keeps the customer file; handles accounts receivable; maintains delivery schedules; prints delivery tickets in the order in which a driver will make deliveries; prints billing forms; and maintains a gas-in-plant inventory, a parts inventory and an appliance inventory.

The gas companies distribute their product in different ways. Some customers are on gas meters, others get their deliveries from a bulk tank truck. Some people come to the plant and exchange propane cylinders, while others have cylinders delivered. The plants also sell furnaces, stoves, and other appliances, as well as spare parts. All these inventory items, as well as the gas itself, have to be tracked. One program on the IBM Personal Computer (the hardware for one installation, two computers, the hard disk, and network connections cost less than \$15,000 list price) does the whole job.

"The first thing to be done," Hutcheon says, "was to determine what had to be done. It's amazing how many people don't know or can't tell you what they do, even though they've been doing it for years. They haven't conceptualized the job. So I had to spend a lot of time finding out just what the system would entail."

The dBASE II programming language, Hutcheon says, is similar to BASIC in that it has high-level syntax and it's interpreted. But there are commands built in that allow simple file manipulation. "It lets you do the things you have to do with a database system," he says. "You can use it strictly as a data-base utility, or you can program it."

Since Hutcheon decided that the

whole system would revolve around the accounts-receivable file, he designed that file first. All it required was determining what information would be kept where in the file. Hutcheon says dBASE II uses files as one class of storage, and records are the subclass of storage on the system. So designing the accounts-receivable file was tantamount to designing the records.

Easy access

After designing the accounts-receivable file, Hutcheon designed the transaction file. Both these files are indexed, which makes them easy to access. An index could be a name, for example, or a date. When you're looking for a particular transaction for a certain customer, you simply tell dBASE II to look for that customer name. It searches through a separate keyword file for the name in question. The name in that index file "points" to the record of that customer, so the program doesn't have to search through the big file. Once it's found the pointer it's looking for, it can go directly to the record in question. It's faster than a sequential search through a large master file. One of the reasons Hutcheon chose to implement this system on dBASE II was its ability to use this kind of file without a lot of complex coding.

"Everything else hangs on those files. So the next thing I did was divide the problem into small procedures, and code those procedures in dBASE II's programming language. I used a procedure something like flow chart although it isn't really that, to define the smaller problems," Hutcheon explains.

Hutcheon says anyone can develop a system similar to his, providing the thought process is both logical and sequential. "There's nothing too different about dBASE II compared to other programming systems," he says. "It's just sloshing files back and forth, and doing something if this number matches that number. It's

very good for doing an application you can't get off the shelf, if it's a single-user application." What dBASE II does provide, he says, is easy file handling.

Stretch computing is an idea whose time has come. From the earliest days of the personal computer, people who wanted to do something else with their machines have been figuring out ways to get it done. Now, the applications programmers have given us some very powerful tools to accomplish more than even they thought possible when they wrote the program. Certainly VisiCalc's developers never envisioned its use as a word processor. And Judith Schwartz, who uses it for just that application, says people cringe when they hear what she's doing with the program. But that makes no difference, as long as the computer is doing what it's supposed to do—increase her productivity.

It's well known that computers can save time and money. Rose Pantoja is proving that again every day as she keeps the San Jose Museum of Art's bookkeeping on course.

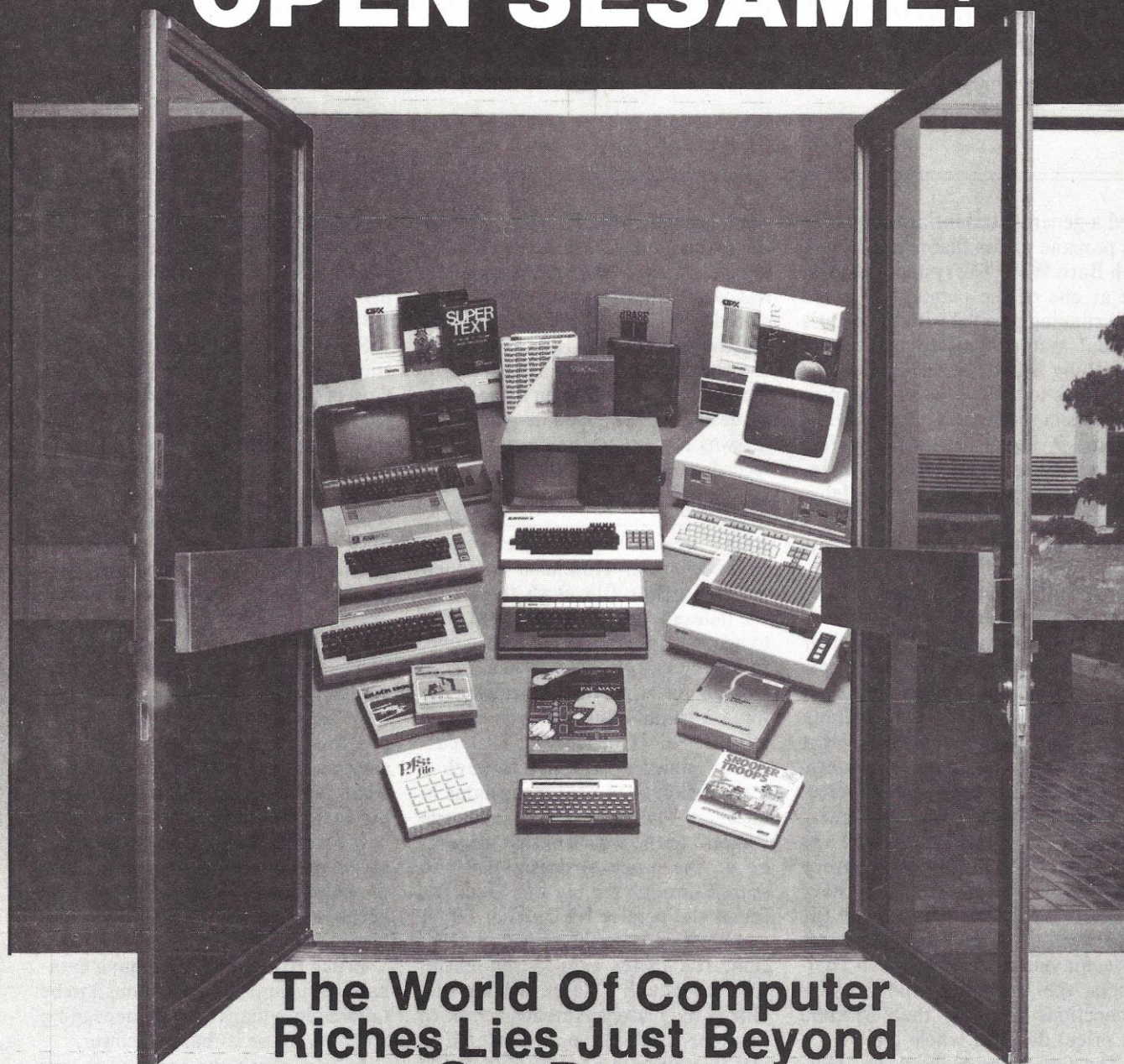
Bruce Hutcheon found that a database manager is flexible enough to be tailored into many shapes, depending on how you use its built-in power.

In fact, that's the common thread in all these stories—the ability to think. If you're willing to think in a different way, to fly in the face of conventional wisdom, you might come up with a program application which will make your job a lot easier. If you can think of your problem in a new light, perhaps you'll be able to devise a way to use compatible software packages for a completely new application, the way the San Jose Museum of Art did. If you can think in a logical manner, you could tailor a data-base manager and end up with something radically different.

Creative thinking will stretch your mind—and your computing—and let you keep on doing things differently, and better.



OPEN SESAME!



The World Of Computer Riches Lies Just Beyond Our Doors.

You don't need any magic words to gain access to a computer kingdom. All you have to do is walk through the door of your nearby Computer Superstores.

Inside you'll find six stores in one—and we haven't done it with mirrors either. We've simply created a store aimed at answering every conceivable computer question and need.

Our Business Solutions Center offers a treasure chest of systems from such manufacturers as Digital, Hewlett-Packard, Kaypro and Northstar.

The gems of the personal computing world, Atari, Commodore, Epson, and Franklin ACE 1000, can be found in our Personal/Home Computers department.

There's a wealth of software for systems from Apple, Atari, IBM, Texas Instruments, CP/M Applications and Commodore—all conveniently displayed in our Softshop.

Our SORBUS™ Microservice is the world's most extensive computer maintenance and parts service.

With over 160 facilities nationwide it's better than a genie in a bottle.

In our Accelerated Computer Training facility our fully trained computer sales professionals will help you become a computer wizard with enough mastery over your software to solve the most complex business problems.

And you'll uncover a fortune in competitively priced peripherals and supplies such as printers, terminals and modems in our Consumer Marketing Division.

It's a king's ransom of computer riches—and it's all yours at Computer Superstores.

COMPUTER SUPERSTORES™

The one place to shop when you can't shop everywhere—

ALBUQUERQUE

1660 Eubank St.

PHOENIX

4001 East Thomas St.

DALLAS

4304 Beltwood Park Way North

We're branching out, so look for us in your area soon.

Portable Power

For the traveling businessman
portable computers are the way to go

by Charles Rubin

When Adam Osborne introduced his Osborne 1 portable computer back in May of 1981, it represented a significant step forward in the development of personal computing as an indispensable business tool. For the first time, it was possible for an executive or manager to leave his office carrying nothing bulkier than a medium-size suitcase and arrive at his destination armed with not only the power and leverage of a sophisticated personal computer, but all the data he would need on disks which fit into a small slot under one of the computer's two drives. And by the simple expedient of adding a modem, he need never be farther than a telephone call away from the combined power of the computers and data banks back in his office.

The problem was, hardly anyone paid any attention—or so it seemed. But by the end of 1981, there was a three-month backlog of orders, and when the year-end sales numbers were tallied, some 40,000 people had agreed with Osborne that portable computing was an idea whose time had come.

Portability wasn't the only reason the Osborne 1 was such a success. It was every bit as much a marketing triumph as it was a technological ad-

Charles Rubin is a free-lance writer and long-time observer of the personal-computer industry.

vance, because inherent in its design was the realization that buying a computer was not a single decision, but several decisions. The Osborne 1



Portable computers are coming into their own as more executives rely on them for computing power away from the office.

resolved those decisions in advance by including everything necessary—except a printer and modem—right in the case. VisiCalc, WordStar, and CP/M were all there. And the whole package was cheap enough to charge on Mastercard or Visa.

Portable computing power had be-

come part of the American landscape, and Leo Grandi was one of the business pros who saw its potential early on.

Grandi, a San Francisco-based administrative consultant, is in the business of setting up computerized time-keeping and billing systems for law firms. One of his biggest challenges is convincing lawyers of the cost-effectiveness of computers in business applications. Grandi was quick to realize that with a portable computer, he could let the technology speak for itself. He ordered one of the first Osbornes (his is serial number 27) and began taking it around to his clients.

"Many law firms are still doing their accounting work by hand," he says. "Some firms that have been around 20 or 30 years have never had a budget. With my Osborne, I can take the computer right to their offices and show what automation can do for them."

Grandi often recommends a software package called LexIntellect, which runs under CP/M on Z80-based personal computers. The software is designed to handle time-keeping and billing for attorneys. "When I can show attorneys a package like this, one that's tailored to their needs and has plain-language prompting, they don't find it so difficult to switch over to a computer." He points out that with the LexIn-

photos by George B. Fry III

tellec package, a relatively minimal investment in a personal computer can solve the accounting problems of up to a dozen attorneys in one firm.

"I use the SuperCalc program that came with the Osborne for budgeting work," Grandi says. "I set up expense categories for clients to show them where their money is going, and how they can cut waste by making a few spending changes. Before I had SuperCalc, it took too long to manipulate budget categories with paper and pencil. It was too expensive for me to spend all those hours changing the numbers by hand. Now, I can bring up a spreadsheet on the computer and demonstrate instantly how changes in one category affect the other parts of the budget."

Grandi uses WordStar to write and edit reports for his clients. "I've used a modem, too," he says. "I had one client who was implementing a time-share billing system, and I wanted to monitor their entries to the time-

share service to make sure they were doing it right. With the modem, I could monitor the client's entries from my own office instead of going to theirs."

In his own office, Grandi finds that the portable increases his productivity. "I'm about 40 percent faster with it," he estimates. As for spreading the use of personal computers to law firms, he says, "So far, the results have been very positive."

Out-computing the competition

There's a lot of competition among manufacturers' representatives, so Mickey Fox uses her portable computer to get the upper hand. Fox represents two furniture manufacturers in a territory covering most of northern California. When Fox goes on the road, her Osborne goes with her.

"With the Osborne," she says, "I can offer services my competitors can't. I use SuperCalc on sales calls to compute various pricing options

for my clients. I enter the dealer cost and various retail prices of an item, and show the markups at each price. It helps the client decide what to charge." Fox also uses SuperCalc to isolate buying trends for her clients. "The average customer carries three to 10 styles of sofas, for example, in as many different colors and fabrics. I can input the history of their account and determine which colors and styles are selling the best."

At the moment, Fox has to enter buying histories manually when she wants to track buying trends, because her files are only set up to store current orders. "At this point I have to take the computer into my hotel room at night and input the buying history to make the calculations. Then I show the results to the client the next day." Fox is currently having her

For many, the portable computer has become a second briefcase, another box of essential day-to-day information.



courtesy of Bill Blume/Computerland, Burlingame, CA

“With the Osborne, I can offer services my competitors can’t.”

dBASE II program modified to allow ongoing storage and retrieval of historical information on each of her 125 accounts.

“Many of my clients don’t have computers at all,” she says, “and they’re impressed when they see what you can do with them. With new clients, Fox does a presentation of the computer’s capabilities to emphasize the competitive edge she has over other manufacturers’ reps.

In addition to SuperCalc and dBASE II, Fox uses WordStar to write sales letters and memos. “I didn’t know anything about computers when I got the Osborne,” she says, “but I joined FOG (First Osborne Group) and they were very helpful. In fact, my dBASE II program is being modified by a FOG member.” Fox says it took her about four hours

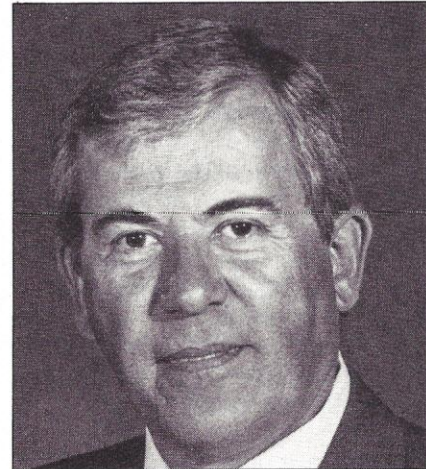
to enter her entire customer list into the computer. When her dBASE II program is ready, Fox will be able to store all her records on diskettes, reducing her paper load significantly.

Portables for everybody

As it was with the first personal computers, the application of portable computers to individual needs has caught the eye of larger organizations. Corporate use of portables is giving organizations the same expanded flexibility enjoyed by individual portable-computer users.

As a vice president of the largest advertising agency in Denver, Collier Buffington’s exposure to computers was limited to more or less traditional applications. “The accounting was done on a mainframe and the typists had word processors,” Buffington says, “but all the creative and budgeting work was done with pencil and paper.”

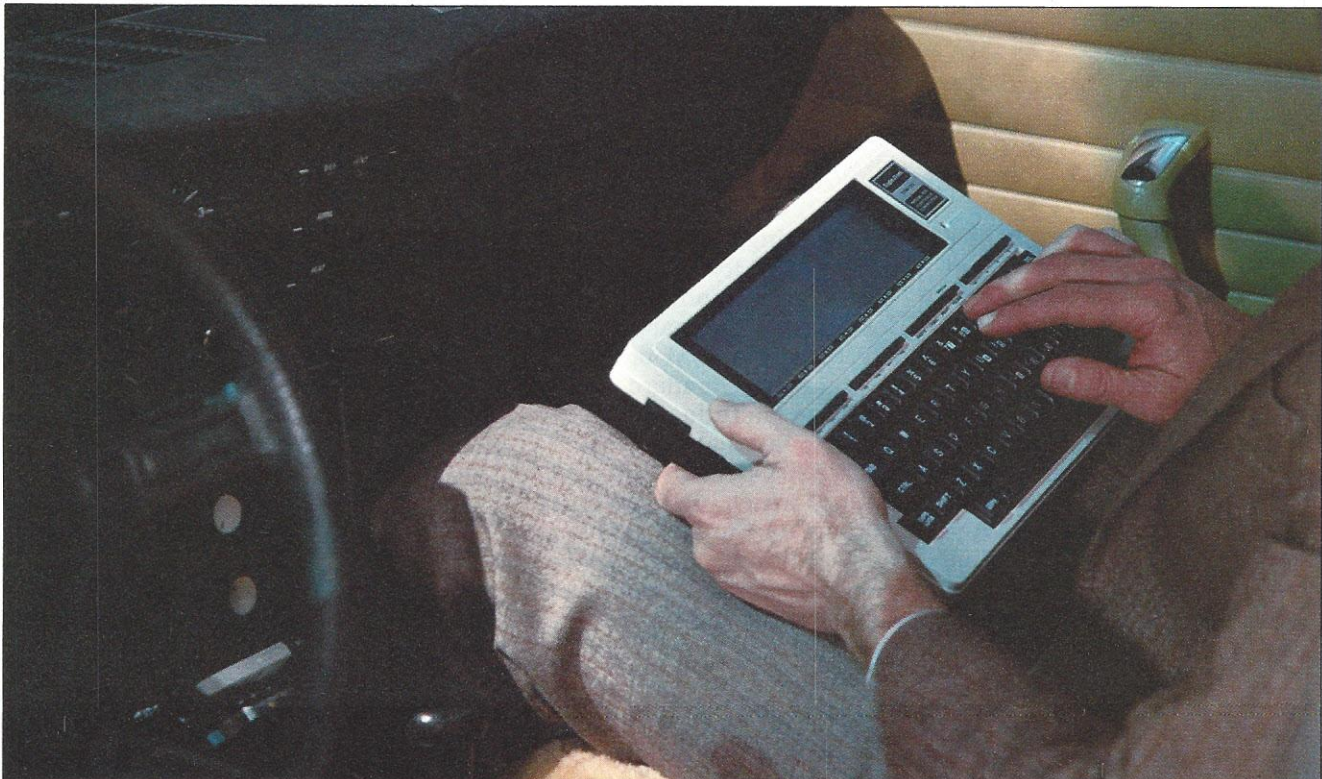
When he started his own market-



Leo Grandi, a consultant and one of the first Osborne owners, is spreading the word about portables to clients.

ing consulting and research firm, Buffington was determined to computerize every facet of his operation. He discovered that portable computers were the most effective solution to his needs. “I wanted to put the tech-

The hand-held portables are becoming more sophisticated with the addition of word processing and communications.



The new COMPAQ Portable Computer. IBM compatibility to go.

Simple, isn't it? The COMPAQ™ Portable Computer can do what the IBM® Personal Computer does. To go.

It runs all the popular programs written for the IBM. It works with the same printers and other peripherals. It even accepts the same optional expansion electronics that give it additional capabilities and functionality.

There's really only one big difference. The COMPAQ Computer is designed to travel.

Carry the COMPAQ Computer from office to office. Carry it home on the weekend. Or take it on business trips.

If you're a consultant, take it to your client's office.

If you use a portable typewriter, you can use the COMPAQ Computer as a portable word processor instead.

If your company already uses the IBM Personal Computer, add the COMPAQ

you'd probably need to buy an additional display screen because the built-in screen is too small for certain tasks, like word processing. The COMPAQ Computer's display screen is nine inches diagonally, big enough for any job, and it shows a full 80 characters across. And the built-in display offers high-resolution graphics and text characters on the same screen.

The bottom line is this. The COMPAQ Computer is the first uncompromising portable computer. It delivers all the advantages of portability

In the standard configuration, the COMPAQ Computer has three open slots for functional expansion electronics as your needs and applications grow. It accepts standard network and communications interfaces including ETHERNET™ and OMNINET™.

If you're considering a personal computer, there's a new question you need to ask yourself. Why buy a com-

puter that isn't portable?

For more information on the COMPAQ Portable Computer and the location of the Authorized Dealer nearest you, write us. COMPAQ Computer Corporation, 20333 FM149, Houston, Texas 77070. Or call 1-800-231-9966.

without trading off any computing power capability.

And what do those advantages

cost?

Nothing.

The COMPAQ Portable sells for hundreds less than a comparably equipped IBM or APPLE® III. Standard features include 128K bytes of internal memory and a 320K-byte disk drive, both of which are extra-cost options on the IBM. Memory and additional disk drive upgrades are available options to double those capacities.

Portable as a mobile unit that can use the same programs, the same data disks, and even the same user manuals.

There are more programs available for the COMPAQ Computer than for any other portable. More, in fact, than for most non-portables. You can buy them in hundreds of computer stores nationwide, and they run as is, right off the shelf.

With most other portables



COMPAQ™

PORTABLE COMPUTER

The most computer you can carry

The success of portables has encouraged expansion of the portable computer industry.

BUSINESS

nology into everybody's hands," he says. He accomplished this with the purchase of five Otrona Attaches.

"I bought the first Attache last June. I used it for writing and research work, and I was getting things done about 40 percent faster than I had before. I also like to work at home, and it's a lot easier to carry work back and forth with the Attache."

The purchase of four more Attaches has extended these advantages to the rest of Buffington's staff. "You can come into the office any night," he says, "and you won't find any of the Attaches here—they all get taken home. Our people are highly motivated. They're used to taking work home. With the Attaches, they get the work done a lot faster and have more leisure time." Three of the machines are used by a copywriter, an accountant, and a market researcher. The fourth machine is a "floater," shared by the media and production departments. "It moves up and down the hall quite a bit," Buffington says.

Text-oriented work is done with WordStar Plus, and statistical analyses are performed with MultiPlan. Modeling and market research are accomplished with dBASE II. There are also modems and telecommunications software for each portable.

The telecommunications link enables the research department to access data bases such as Dialog, CompuServe, and The Source for statistical abstracts used in market research. The modems also permit electronic mail transmission between staff members in various locations. "One of our people is home right now with a broken leg," Buffington points out, "but he just does his work there and sends it in over the phone to another Attache here." Two research associates in another office have linked their IBM Personal Computers to an Attache in Buffington's research department to send and receive data.

Buffington says portable com-

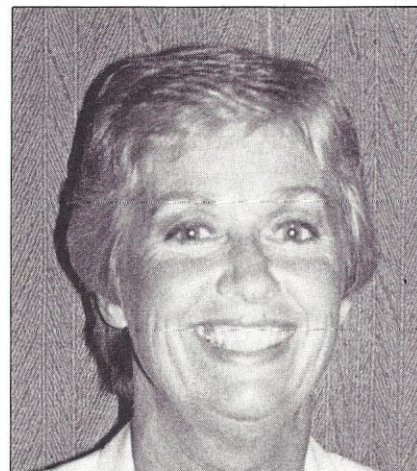
puting has had two significant effects on his organization: faster turnaround and lower overheads. "With the text processors, our people can correct their own reports and letters and then print them out without a typist or secretary. That not only saves a step in the turnaround process, it also eliminates the need for clerical support personnel." He points out that other firms like his have two or three secretary/typists to support the staff. His organization has none. "With everyone using a computer and sharing three printers, there's no typing to be done. And since our files are kept mostly on diskettes, we don't need a file clerk."

When his Attache isn't moving between home and office, Buffington sometimes takes it on client presentations. Instead of wrestling with a bulky printout, he can retrieve specific research data quickly and easily.

Buffington is pleased with the power of portables, but now he wants to expand their capabilities even more by setting up a local area network to tie them all together. "I'm looking at systems like the Corvus Omninet, which will allow major functions like accounting to be centralized." Such a network would allow each Attache to link up to a central office data base containing office files. Once this is accomplished, a staffer with an Attache and a modem will have virtually the entire information resources of the firm in one portable 18-pound unit.

Less is more

The success of portables like the Osborne, Kaypro, and Otrona in large and small organizations has encouraged expansion of the portable computer industry. There are now over a dozen portables being marketed to banks, insurance companies, factories, and research laboratories. And as early qualms about small display sizes and limited on-line storage have disappeared, a new generation of por-



Mickey Fox, a furniture sales representative, takes her Osborne on sales calls to keep clients aware of pricing trends.

table computers has appeared. Using technological advances like bubble memory, flat-screen LCD displays, and long-lasting, quick-recharging batteries, the new ultraportables are going places where the early portables couldn't go.

Foreign correspondent

Jack Swanson is the Pacific correspondent for the Seattle Post-Intelligencer. His job frequently takes him to Singapore, Hong Kong, Tokyo, and other places throughout the Pacific Rim. Not long ago, Swanson retired his reporter's notebook and replaced it with a Hewlett-Packard HP-75 hand-held computer. The 1½-pound unit serves as his address book, notebook, and typewriter.

"It's really more versatile than I thought when I got it," Swanson says. "The keyboard is smaller than a normal typewriter's, but I can touch-type on it anyway. I use the computer to take notes in interviews. I can set it in my lap and type without losing eye contact with the other person. It's also a little faster than hand-written notes.

When it's time to write his story, Swanson uses an HPIL 24-column, dot-matrix printer to provide a copy
(continued on page 93)

VISIBLE VISICALC ON A ONE-LINE DISPLAY

You can put a Hewlett-Packard HP-75C Portable Computer into your briefcase—it's only 5 by 10 by 1½ inches. And you can put VisiCalc—the famous electronic spreadsheet program—into a 75C, just by popping a tiny (2 by 1 by ½ inches) solid state cartridge into one of the 75C's three cartridge slots. But how do you see your VisiCalc worksheet on the 75C's 32-character one-line display?

The secret is context. The rows and columns of VisiCalc spreadsheets generally relate financial factors (rows) to time factors (columns). Each row and column has a descriptive heading and a number or letter designating its position. So the meaning of each cell comes from its context—the value of a given financial factor, determined by a given formula for deriving that factor, shown for a particular point in time.

So whenever you look at a particular cell on a physical spreadsheet, you need to know what row and column intersect at that cell, what formula was used to determine its value, and the cell's current value. When you want to look at a given cell with HP-75 VisiCalc, you move your one-line "window" to the cell in question with cursor control keys or with a GOTO command specifying the cell's column and row.

The first thing shown in the window is either the appropriate column and row headings, or their position on your spreadsheet. You can choose either display, and alternate between them at the touch of a key. The second thing in the window is either the formula or the value of the cell—and again, you can switch back and forth between these. This makes a total of four ways you can look at any given cell, depending on

your preference. Hit another key and you're back on the command line, ready to use any of the processes common to spreadsheet analysis programs. Four programmable function keys on the 75C allow you to use the different VisiCalc functions rapidly.

Also, you're not limited to the one-line display. You can get a 32-character by 16-line display on a monitor or television set with a \$295 Video Interface box, which is sufficient to show up to five VisiCalc columns and 14 rows, with the 75C's own display being used to enter new values and formulas. But the miracle is how well the 75C lets a user work with VisiCalc away from his office or hotel suite, on that one 32-character line. And you can print out spreadsheets on a small accessory printer, as well as saving them on an accessory cassette machine.



The portability of the HP-75 enables Swanson to use it on airplane flights.

(continued from page 91)

of his notes. Even though the text-formatting software for the HP-75 wasn't available at first, Swanson said the unformatted notes were still easier to read than his handwriting. While overseas, he can print out a finished story 24 columns wide and then give it to a Telex operator to transmit to the newspaper's mainframe computer in Seattle.

When it becomes available, Swanson plans to use an RS-232-C interface to hook a modem to his computer. "Once we work out the software," he says, "I'll be able to transmit directly to the paper's computer, bypassing the Telex operator." Being a relatively new product, the HP-75 has a limited software base, but Swanson found he could write simple programs in BASIC with the aid of the computer's user manual. "The manual was very helpful," he says. "It had a lot of sample programs you could do to get the hang of it." So far he's written the address-book program, which allows him to call up a separate file of names and addresses for each area he's traveling to; a tax data program to help him compute his taxes; and a babysitter's note program that allows him to compose custom notes to different sitters telling them his location, phone number, and when he expects to return.

Prospective users of HP-75s may find the limited on-line storage (24k RAM) a drawback, but Swanson says it hasn't bothered him. "There's a built-in magnetic card reader on the computer," he says, "and if the memory fills up I can dump it onto mag cards. I carry about 100 cards with me when I travel."

The computer, printer (which weighs 1½ pounds), and magnetic cards fit easily into Swanson's shoulder bag. The unit is rugged and small enough to work anywhere. Although the LCD screen displays only 32 characters, it can scroll across a 96-character line. "If I want to see a whole page of text," Swanson says, "I

can use one of the built-in hookups to connect the computer to a monitor or a regular television."

The portability of the HP-75 enables Swanson to use it on airplane flights. "I pulled it out to work on a story coming back from Japan," he recalls, "and suddenly there was a crowd of people around me, watching. Everybody was fascinated." Some of the onlookers turned out to be other journalists whose remote telecommunications terminals and portables had to be stowed away in flight.

Taking it to court

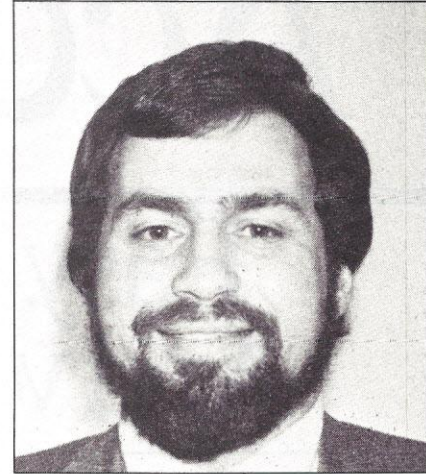
Jeffrey Allen's law office had been using a TRS-80 for accounting, and for accessing a legal data base for several months. And he'd used an Apple II at home for about a year before he decided to venture into portable computing. "Let's say it's an experiment I have a lot of faith in," he says.

Last summer, Allen persuaded his partners to buy an Otrona Attache portable computer for "litigation support." The experiment involves taking the Attache into the courtroom to provide fast, easy access to documents during a trial.

We haven't actually taken it to court yet," says Allen, "because our first computer-supported case hasn't come to trial." The firm has been storing case documents in computer files since last fall, but the business litigation cases handled by Allen's firm take from 1½ to 2 years to come up. He hopes to give the Attache its debut in Oakland courtrooms by the end of this year.

"For now," he says, "our staff inputs the document summaries into the computer files. When I want to work on a case at home, I can take the Attache and a couple of diskettes, instead of several boxes of papers."

Allen uses a modified version of dBASE II to manipulate case information. "If, for example, I want to pull information from every docu-




Attorney Jeffrey Allen plans to use an Attache portable computer in the courtroom to access case documents during trials.

ment that relates to one specific issue in the case, it's easy on the computer. Most deposition summaries are in simple chronological order, so when I wanted an issues-oriented summary it meant cutting and pasting the document or retyping it. With the computer, I can rearrange the documents and print them out any way I want."

Allen did the dBASE II modifications himself, and admits the process was time consuming. "When you computerize a procedure," he says, "there's always a big front-end time investment. For a while it seems a lot slower to do the procedure on the computer, because you're getting used to it. But once you've got the bugs out of the new system, you save a lot of time."

When he's not tinkering with dBASE II, Allen uses the Attache's WordStar Plus software to write memos at home or at the office. He has a printer at each location.

Will the experiment be a success? Allen thinks so. "The more information you've got and the quicker you can get to it, the better the quality of your work will be." It's a statement that will be echoed by more and more people as they discover new applications made possible by portable computers. 

Simplicity AccountingTM

Easy. Fast. Accurate.
And very very friendly.

Hayden's Simplicity Accounting software is a natural extension of your bookkeeping system. All the advantages of computer technology with the simplicity of a manual method. No hassles. Just great accounting software for your small business.

Hayden's easy-to-use programs are designed for the company just beginning to use computers for financial tasks. They operate like a

manual or ledger card system but with the speed, accuracy and auditability of an automated system.

You perform one transaction at a time, while the software does all the calculations, updates records and prints totals in seconds. Instructions are displayed "menu-style" on the screen in a clear, uncomplicated fill-in-the-blank format that keeps the whole operation extremely simple.

This friendly new software was written by people who have worked with small businesses for many years. It offers all the features your small business needs in a no-nonsense, straightforward set of programs that is efficient and inexpensive. Also, Hayden's Simplicity Accounting bookkeeping systems are fully integrated and run under the popular CP/M* operating system.

Easy to Use

You'll be able to use Simplicity Accounting software as soon as you get it back to the office. It is easy to learn because it does bookkeeping the way you've always done bookkeeping: just call up a file and record your transactions; enter payments, debits, payroll information, inventory data. Then put it away and go onto the next. That's it. No batching problems. No hassles. In fact, Simplicity Accounting uses the same "enter-it-process-it" ap-

proach that small businesses have used to keep their books since long before the computer came around. No disruption in your office procedure. The way you've always done bookkeeping, only faster, better and much more accurately.

More than Bookkeeping

Simplicity Accounting gives you management information almost impossible to get from a manual system. And it is accurate, up-to-the-minute information, available now so you can make critical business decisions with all the facts. Control cash flow, analyze sales, avoid stock outs, monitor the pulse of your business.

The Simplicity Accounting System

General Ledger

The General Ledger module has two distinct parts: General Ledger posting with related reports, and Financial Statements. It can be used with the other programs in the family or as a free-standing system. And

*CP/M is a trademark of Digital Research, Inc.

it is very flexible so you can easily tailor it to your specific needs. In addition, the General Ledger module can be used as an excellent client writeup program for a small accounting or bookkeeping service.

- System allows department profit analysis and consolidation.
- System can work with a 12 or 13-period year.
- Comparisons can be made against last year's figures or against budget, in percentages or as dollar variances.
- Report formatting is accomplished through separate format records.
- Custom reports to prepare various journals.

Order No: 204xx

Price: \$449

Accounts Receivable

A fast, high-volume, easy to use debit/credit posting system to replace manual "peg-board" systems or bookkeeping machines. Combines simple operation with sophisticated capabilities. Automatic General Ledger integration is optional.

- Payments posted to either oldest or selected invoices.
- System accepts partial payments.
- Open-item inquiry and statement preparation.
- Automatic finance charges applied to all or selected accounts.
- Complete account analysis.

Order No: 205xx

Price: \$449

Accounts Payable

An effective way to manage cash requirements. For businesses on a cash basis, accrual basis, or combination. Automatic General Ledger integration.

- Selectable report reflects either past unpaid invoices or future cash needs.
- Open/unpaid item worksheet serves as turnaround document.
- Valid account number verification of General Ledger distribution made either during vouchering or check writing.
- Automatic G/L posting of both purchase journal and cash disbursement journal.

Order No: 206xx

Price: \$449

Payroll

Fast, easy to install and operate. Just enter pay period data for each employee. Checks are cut and records adjusted immediately. Automatic General Ledger integration optional.

- Multi-state payroll tax calculations.
- Automatic calculation of earnings, taxes and deductions.
- Up to six automatic deductions per pay period.
- Provision for operator override of all calculations.
- Easy handling of terminated "early payoff" employees.
- Permits more than one check per period for each employee for vacation, bonus, etc.
- Produces quarterly earnings and deductions reports.
- Can maintain Federal, FICA, state and local tax tables.

Order No: 207xx

Price: \$449

Inventory

Stand-alone program gives management and purchasing personnel an up-to-the-minute analysis of inventory stock levels, product sales performance and profitability on an item-by-item basis. Provides tools to help keep inventory levels at a minimum while avoiding "stock outs."

- All records updated, journals printed as data is entered and verified.
- Products can be divided into categories, items sorted and reported by product group.
- Last or average cost methods may be used.
- Three sales prices stored.

- Items may be assigned either internal or supplier-generated codes.
- Can print physical inventory list worksheet.
- Actual inventory adjustments easily made.
- Inquiry on an item displays the whole record.

Order No: 208xx

Price: \$449

It Grows with You

Start with any of the Simplicity Accounting modules and add others as your business expands. All are truly modular and integrate with General Ledger when you're ready. Begin with Receivables or Payables today and expand to Payroll or General Ledger tomorrow, or next month or next year. Simplicity Accounting is a bookkeeping system you can stay with for a long time.

The Hayden Advantage

Simplicity Accounting systems do not stand by themselves. They are all part of the growing family of Hayden Software, designed, built and supported by a company with the experience and resources to give you more than just great accounting software. All Hayden software is fully tested and warranted. User manuals are complete and thorough, 3-ring bound in a handsome, durable slip case. Training materials and menu screens get you up and running fast, and keep you out of trouble.

Hayden provides a full range of software for your computer, including word processing, entertainment, educational and technical products. Visit your local dealer and learn about the Hayden advantage.

Discover Hayden's Simplicity Accounting. No hassles. Just great accounting software for your small business.

**Available at your local dealer, or call toll free: 1-800-343-1218
(In Mass. call 617-937-0200)**

HAYDEN SOFTWARE

How To Pick A Portable Computer

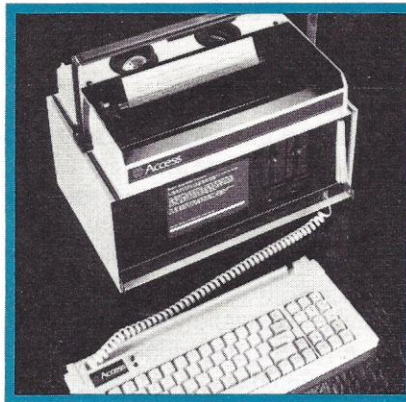
A buyer's guide to features and capabilities
of portable and hand-held computers

by David Gabel, Senior Editor

Should you buy a portable computer? There are a couple of good reasons for answering that question with a resounding yes. But first—what is a portable computer?

Portable computers are any computers which are so configured that they can be closed up and put under an airline seat. When we say portable we don't mean hand-held. A hand-held computer is just that—a computer you can hold in your hand while you're working with it. While all hand-held computers are portable, not all portable computers are hand-held.

Generally, portable computers provide more computing power, mea-



The new Access computer combines a printer and modem in its all-in-one package. The display is unique for portables: it's amber for reduced eyestrain.

sured in RAM and ROM, than do hand-held computers, because the portable computers are bigger and have more room for memory than the hand-held machines. In fact, most portable computers can give their users as much computing power as a full-blown computer. And newer models incorporate printers and modems, providing a full computer system in a compact package.

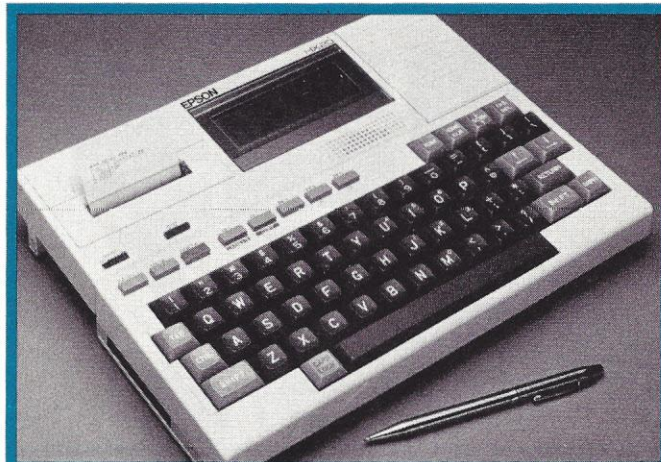
There are at least two obvious reasons for buying a portable computer—portability and cost. Portability means just that—you can pick up the computer and carry it around which, in some cases, means cost effectiveness. In a company which



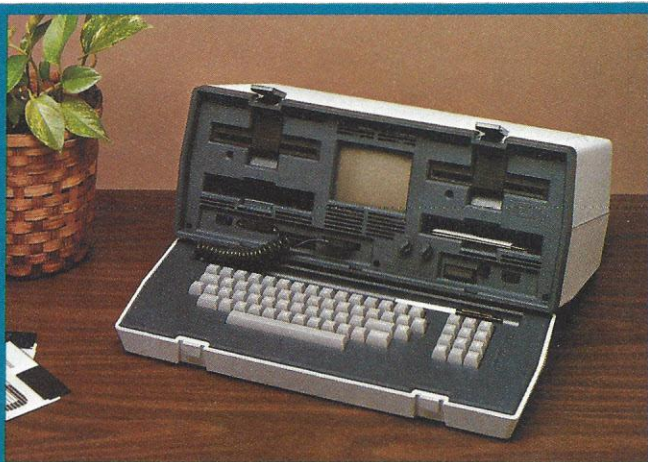
Although it has only a one-line display, the TI compact Computer 40 allows you to scroll up and down and left to right on an 80-column line, giving you a window on your data.



Casio's FX-802P hand-held computer includes a built-in printer for recording data or programs. The machine uses batteries for its power supply, and has a one-line screen display.



Epson's HX-20 is a complete personal computer, less disk drives, despite the fact that it will fit in your hand. The four-line display scrolls so the user can look at a full line of text.



You can get the Osborne I with half-height floppy-disk drives, which put as many as four drives in a compact package. I/O ports are placed directly under the drives and screen.

needs computing, for example, but doesn't want to spend the capital required to equip everyone who could use one, portable computers could be the answer. When one employee finishes with it, the person at the next desk can use it.

Another problem that can be solved by the use of a portable computer is the one of limited office space. Hardware designers are busy searching for ways to reduce the "footprint" of computing equipment on the top of the desk. A portable

computer gets around this space squeeze because when it's in use, it can fit on top of an average-size desk. When it's not being used, it can be closed up and put away under a desk. The work space becomes available for other users. No special—and costly—computer workstations are necessary.

For many businessmen, carrying a portable computer into the field for reasons as varied as remote data gathering to sales presentations makes good business sense. Salesmen

who need to compute away from the home office, say, can use a portable computer to enter order information and then transmit that information to the home-office computers. Or in the case of people who can't get away from it all, even when they are away from it all, portable computers are easy to carry along on a vacation or weekend excursion.

The other advantage of portable computers is low cost. Adam Osborne stunned the computer world two years ago when he introduced his



You can carry the Pied Piper with you on a trip, and plug it into a motel's TV set for a display—the rf modulator to make such a connection is already built into the unit.



The Compaq portable computer supports all IBM Personal Computer software without modification. None of that software is bundled with the computer, however.



The Starlite computer, of which the above is a prototype, is unique in that it uses the S-100 bus for added peripheral expansion. Four slots are also available for additional cards.



The Otrona Attache features a small video display and 5 $\frac{1}{4}$ -inch floppy disk drives. Its package is one of the smallest of the portable computers on the market.

Osborne 1, which cost about \$1800 including 64k of RAM, a CRT display, CP/M, and applications software (SuperCalc and WordStar with MailMerge). There are many stories around the industry about how the cost got to be so low, but Adam Osborne himself gave a few reasons at the 1982 West Coast Computer Faire. It was, he said, because the company knows how to buy in quantity, and how to keep manufacturing costs down.

If that was the case, others learned

quickly, because now a whole slew of new portable computers are appearing, many of them priced competitively with the Osborne machine.

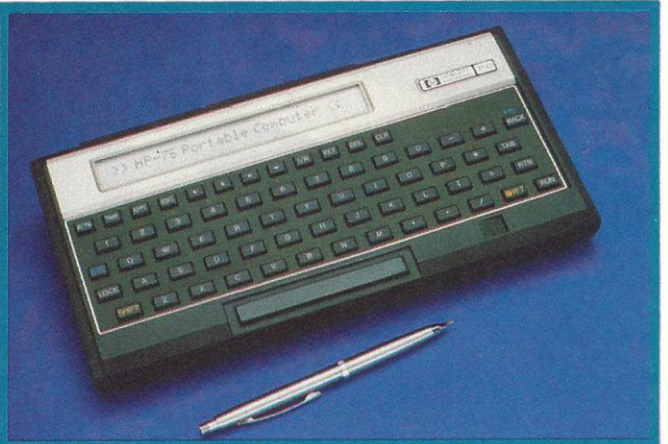
In the case of almost all portable computers which aren't hand-held, you get a full working computer with keyboard, display, disk drive(s), and software. Newer portables, like the DOT from Computer Devices and the Access from Access Matrix Corp., also provide other built-in peripherals. Having said that, the generalities end, because portable

computers are substantially different from each other. Some of them use 5-inch-wide displays; some displays are larger. Some of the computers have small keyboards while others use full-size Selectric-like keyboards. Certain models are supplied with the new micro-floppy drives, while others employ half-height 5 $\frac{1}{4}$ -inch units. Some of the portable computers work off batteries; some require the presence of 110V AC. The variations are complex and important.

The variation among the software



The 9-inch screen of this Kaypro portable computer allows you to display more columns on your spreadsheet. The computer sports double-density floppy disk drives.



The HP-75C portable can be connected to a number of peripherals to create a complete portable computer system. The computer also interfaces easily to HP's Series 80 computers.

If you've decided on a portable, remember the need for data backup.

is as great as among the hardware. Some computers, like the Osborne 1 and the Kaypro II, provide CP/M-compatible software. Others, like the Compaq, use software compatible with the IBM Personal Computer. Unfortunately, in the case of the Compaq computer, while it will run IBM software, the software isn't included in the price of the machine. Nevertheless, programs for the Compaq and other IBM-compatible portable computers run under MS-DOS, an operating system that appears under a number of pseudonyms, but is the same operating system as PC-DOS, supplied with the IBM Personal Computer. Thus, some of the portable computers provide only barebones software, utilities, and the like, while others come "bundled" with full application-software packages.

Running software

The application-software packages are similar in function, so if you're considering a portable computer whose price includes application packages, you can easily compare the machines by sitting down at them and running the software. You might find you prefer Perfect Writer, available on the Kaypro II, to WordStar, available on the Osborne. That makes your choice of portable computer relatively easy, if the available software is the only variable you're concerned about.

But it probably won't be. One area of contention in portable computers is the display. Some people find the 5-inch CRT of the Osborne computer a bother; others don't. Tom Hayes, a marketing manager for Osborne, says the company has addressed that problem by providing the capability to plug in an external monitor which gives access to a full-size display. "But" he says, "I have an Osborne 1 on my desk, and I don't find the small display a problem at all."

Indeed, one staffer at *Personal Computing* uses an Osborne 1 for all his work, and he reports he quickly

got used to the small display; it doesn't bother him at all. He could use the larger monitor, but he sees no real need for it.

Still another variable is the storage capacity available on the computer. Some portable computers provide you with one or more single-sided, single-density disk drives. The capacity numbers quoted for these drives vary. But generally, such drives will store fewer than 200k on a single disk. Providing a single-sided, double-density drive will double the storage per disk to about 400k. Kaypro, which provides the single-sided drives on its Kaypro II, quotes 191k for each of the drives. When you're comparing capacity figures, by the way, make sure you're talking formatted capacity. This is the data capacity of a disk with all its sector marks and other overhead already written on it. It's less than unformatted capacity, which is that of a blank disk which can't be used until it is formatted.

Some portable computers provide the capability to incorporate a hard disk. As you read this, Kaypro will be shipping sample copies of its new Kaypro 10 computer, with a 10-Mb Winchester disk, to its dealers. The software bundled with the computer will reside on the hard disk. This will provide a lot more storage than the floppy drives, with an additional \$1000 added to the price tag. If you need the storage, it's a good idea to look at a portable that has a built-in hard disk.

The need for backup

If you've decided to go for a portable computer with an internal hard disk, remember the need for data backup. It wouldn't make a lot of sense to have all that data on your hard disk, and then have the baggage handlers for Fly-by-Night airlines lose your computer and data for, say, a week or so, by accidentally sending it to Afghanistan. Most portable computers will slip under an airplane seat, but

then what do you do with your feet? You might want to ship the computer in the baggage compartment anyway. In any case, backup is extremely important in the case of a hard disk that's permanently located in a machine you will be carrying around. So if you're interested in such a computer, make sure you get a floppy drive in the package, too, and then make sure you carry the floppies you use for backup in a separate piece of luggage when you're traveling.

The two-drive system

While backup isn't quite as critical in the case of a floppy-drive-based machine, it's still a good idea to get two drives, instead of opting for one double-density type. You'll almost certainly want to make copies of your data from time to time, either for backup or for distribution to others. Two drives remove the drudgery of making copies with one drive. Again, you should have backup disks for traveling, and you can carry the backup copies in your carry-on luggage if you check your computer through. You can always buy a new computer—you pay hard cash for it. But you pay with time if you have to reconstruct your data files.

Every computer has to communicate with external devices if it is to be of any use. This means it must have I/O ports that get information into and out of the machine. Almost all portable computers come with a variety of I/O ports. The most common are serial ports for connecting devices like serial printers and modems, and Centronics-compatible (Centronics is a printer manufacturer whose printer interface has been accepted as a de facto industry standard) parallel ports. There are other possibilities. Osborne has an IEEE-488 parallel port instead of a Centronics port. Not to worry, though. The company has put some patches in the CP/M operating system that comes bundled with the computer, to allow ordinary paral-

lel printers to run on the 488 port.

There's really not much to say about the ports on these computers, except that more is better. If a machine has two RS-232-C serial ports, you can connect two serial devices at a time instead of one. That will allow you to use a serial printer and a modem without disconnecting and reconnecting. If you'd like to have an external monitor to supplement the smaller built-in one, make sure the computer provides an external video connection so you can hook up the monitor.

More expandability

There's one computer, the Star Lite, that provides more expandability than most because, in addition to the normal complement of ports, it uses the S-100 bus and leaves four slots open on the bus. Bus-oriented computers are inherently more versatile than are single-board computers, because of the variety of attachments with which you can customize them. They're also more expensive. In this particular case, there are literally hundreds of S-100 boards you can plug into the Star Lite which comes from Compushop in Cambridge, Mass. George Davis, Compushop's general manager, says this computer isn't for the average user, but if you have a need for a customizable portable—maybe one that can easily do A/D conversion for field scientific work, say, this could be it.

There's another class of portables that's smaller than those we've been discussing. This class is typified by the Hewlett-Packard 75. Hewlett-Packard calls its 75 portable, but tries to distinguish it from under-the-airplane-seat portables by calling those larger machines "transportable computers." Jack Peters, a product manager for HP in Corvallis, Ore. says the 75 is designed for people who need to run a BASIC-programmable computer in places that don't have AC power. The 75, and a few other portable computers, have built-in

batteries that obviate the need for a wall plug, and also have low-power CMOS (complementary metal-oxide semiconductor) memory which retains its information while using very little power. The batteries will keep the memory going for a long time. You can even change batteries without losing the data—provided, of course, that you're very quick.

These small portables don't deliver full-size displays, but they do allow you to scroll your information. You can think of the display you have as a "window" on the full display. An 80 by 4 display, for example, like the one on the Athena, lets you scroll up and down to see the other lines of your data. The HP 75, the TI Compact Computer 40, and the Epson HX-20 provide up and down and side-to-side scrolling which allows you to see not only more lines, but wider lines than can be crammed into the small display.

The hand-helds

A step down from the portable computers (which fit into a briefcase) are the hand-held computers. These are the very tiniest of computers. They come with small amounts of RAM and ROM, and are suitable for only a few applications. Their chief utility is their ability to handle remote data collection. You can see this by comparing their specifications with those of the larger computers in the buyer's guide chart (page 102). The very small computers have much less memory than their larger cousins, and there is often no packaged software for them. This means you have to program them in BASIC, or FORTH for the Epson, for particular applications, in much the same way people used to have to write programs for Apples and TRS-80s. This should change as the hand-held computers gain popularity. Radio Shack, for example, just released a number of programs for its PC-2 pocket computer. HP provides ROM-based software for its HP 41C hand-held computer in small plastic

packages. You use these software modules as you would a video-game cartridge: Turn the computer on with the appropriate package plugged in, and your computer is ready to go.

Hand-held computers are handy little devices because they are so easy to carry around. The Radio Shack Pocket Computer really does fit into a shirt pocket. It's programmable in BASIC, can be connected to a four-color printer/plotter which uses four small pens to draw characters when you're printing, and has a one-line alphanumeric display. Some hand-held computers, like the Panasonic Link, can be bought already fitted into a briefcase containing the computer and its peripherals—a modem, printer, storage, and the like.

They're handy because they usually interface readily with peripherals and even larger computers from the same manufacturer. If they have a modem, of course, you can use them to talk to your stationary computer back at the office. But they can do more than that. Often they have provision for using a TV set or a dedicated video monitor to show you a full display. Some, like the HP 41C, use special interface capabilities to drive a whole list of peripherals which also run with the larger computers, like printers and plotters.

What about price?

If you're in the market for a computer at all, it makes sense to consider a portable—if for no other reason than price. A portable computer with its bundled software is a good deal. If you take a full-blown, desk-top computer for example, with monitor, printer, disk drives, modem, and a couple of other options, it will retail for about \$3000—without the software. That's an estimate, of course. Prices vary greatly. An Osborne 1 and a Kaypro II go for \$1795, and they have software included for common professional applications. They also include two disk drives, so all you need to add to equal that desk-top are

If you're in the market for a computer, it makes sense to consider a portable.

a modem and a printer. Figure on spending about \$3000 for the total package. Of course, you sacrifice the larger monitor to get that, and you may also have to compromise on the software.

Some choices

Here's what all that means. If you like WordStar, then the fact that this program comes bundled with the Osborne 1 is a great feature for you. WordStar is a standard, of sorts, which means a lot of people in the world use it. You're likely to be able to find people who can help you with it if you run into a problem. But suppose you're one of those people who, having tried this word processor, just don't like the way it works. Then you have to make a decision that could affect the computer system choice as well as the software choice.

In fact, this could swing you away from the Osborne 1 to one of the computers which runs the Perfect series of software. If that's the case, then you may be giving up the support you could get from a particular Osborne dealer you really like, or you might not get some other feature available on the Osborne that you're especially fond of. We're not picking on the Osborne computer here. The same thing goes for any of the portables that offer bundled software.

David Kay, vice president of the Kaypro division of Non-Linear Systems, points out that software bundling relieves the computer buyer of making the software choice, and he suggests that the total system is important. That's true, but it flies in the face of conventional wisdom in buying a computer, which says that the application determines the software, and the software required for the application determines the hardware needed to run that software. In the case of portables with bundled software, the system manufacturers have decided which applications are most

(continued on page 165)

(chart begins on the next page)

PORTABLE AND HAND-HELD COMPUTERS BUYER'S GUIDE

ACCESS MATRIX CORP.
2159 Bering Dr.
San Jose, CA 95131
(408) 263-3660
CIRCLE 250

DIGITAL MICROSYSTEMS
1755 Embarcadero
Oakland, CA 94606
(415) 532-3686
CIRCLE 275

PERIPHERAL SYSTEMS INC.
100 Lincoln Dr. E.
Marlton, NJ 08053
(609) 983-7300
CIRCLE 279

ADCOCK & JOHNSON
P.O. Drawer 8778
Fort Worth, TX 76112
(817) 429-5131
CIRCLE 251

DYNALOGIC INFO-TECH CORP.
81 Colonnade Rd.
Ottawa, Ont., Canada
K2E 7M6
(613) 226-1383
CIRCLE 276

PERSONAL MICRO COMPUTERS
INC.
475 Ellis St.
Mountain View, CA 94043
(415) 962-0220
CIRCLE 280

ATHENA COMPUTER &
ELECTRONICS SYSTEMS
31952 Camino Capistrano
San Juan Capistrano, CA
92675
(714) 661-2276
CIRCLE 272

EPSON AMERICA INC.
3215 Kashiwa St.
Torrance, CA 90505
(213) 539-9140
CIRCLE 257

QUASAR CO.
9401 W. Grand Ave.
Franklin Park, IL 60131
(312) 451-1200
CIRCLE 281

CASIO INC.
15 Gardner Rd.
Fairfield, NJ 07006
(201) 575-7400
CIRCLE 252

GRID SYSTEMS
2535 Garcia Ave.
Mountain View, CA 94043
(415) 961-4800
CIRCLE 258

RADIO SHACK-TANDY CORP.
One Tandy Center
Fort Worth, TX 76102
(817) 390-3011
CIRCLE 264

COMMODORE BUSINESS
MACHINES
487 Devon Park Dr.
Wayne, PA 19087
(215) 687-9750
CIRCLE 253

HEWLETT-PACKARD
1000 Circle Blvd. NE
Corvallis, OR 97330
(800) 547-3400
CIRCLE 259

SEEUQA COMPUTER CORP.
209 West St.
Annapolis, MD 21401
(301) 268-6650
CIRCLE 265

COMPAQ COMPUTER CORP.
12330 Perry Rd.
Houston, TX 77070
(800) 231-9966
CIRCLE 254

JONOS LIMITED
920C E. Orangethorpe
Anaheim, CA 92801
(714) 871-1082
CIRCLE 277

SHARP ELECTRONICS CORP.
10 Sharp Plaza
Paramus, NJ 07662
(201) 265-5600
CIRCLE 266

COMPUTER DEVICES
25 North Ave.
Burlington, MA 01803
(800) DOT WORD
CIRCLE 255

MICRO SOURCE INC.
P.O. Box 319
New Lebanon, OH 45345
(513) 687-1374
CIRCLE 278

STM ELECTRONICS CORP.
525 Middlefield Rd.
Menlo Park, CA 94025
(415) 326-6226
CIRCLE 267

COMPUTERSHOP
139 First St.
Cambridge, MA 01241
(617) 661-2670
CIRCLE 256

NON-LINEAR SYSTEMS
533 Stevens Ave.
Solana Beach, CA 92075
(619) 755-1134
CIRCLE 260

TELCON INDUSTRIES INC.
1401 NW 69th St.
Fort Lauderdale, FL 33309
(305) 971-2250
CIRCLE 268

COMPUTER SYSTEMS
26401 Harper Ave.
St. Clair Shores, MI 48081
(313) 779-8700
CIRCLE 273

OSBORNE COMPUTER CORP.
26500 Corporate Ave.
Hayward, CA 94545
(800) 227-1617
CIRCLE 261

TELERAM COMMUNICATIONS
CORP.
2 Corporate Park Dr.
White Plains, NY 10604
(914) 694-9270
CIRCLE 269

CORONA DATA SYSTEMS INC.
31324 Via Colinas, Suite 110
Westlake Village, CA 91361
(213) 707-0672
CIRCLE 274

OTRONA ADVANCED SYSTEMS
4755 Walnut
Boulder, CO 80301
(303) 444-8100
CIRCLE 262

TEXAS INSTRUMENTS
23-01 N. University
Lubbock, TX 79415
(214) 995-2011
CIRCLE 270

PANASONIC COMPANY
One Panasonic Way
Secaucus, NJ 07094
(201) 348-7182
CIRCLE 263

TIMEX COMPUTER CORP.
P.O. Box 2655
Waterbury, CT 06725
(203) 573-5000
CIRCLE 271

Portable And Hand-Held Computers

COMPANY/ PRODUCT	IBM-COMPATIBLE?	SIZE (CLOSED)	HAND-HELD (H) OR PORTABLE (P)	WEIGHT	DISPLAY SIZE (COLUMNS X LINES)	DISPLAY SCROLL (U,D,R,L)	DISPLAY TYPE	MEMORY SIZE (MIN., MAX.)	NO. AND TYPE DISK DRIVES (H-HARD; F-FLOPPY)
ACCESS MATRIX CORP. Access	N	16 ¹ / ₈ " × 10 ¹³ / ₁₆ " × 10"	P	33 lb.	80 × 24 (25th-status line)	U,D,R,L	CRT	64k	2 5 ¹ / ₄ " (F)
ADCOCK & JOHNSON Model 3000 (Model III in a Briefcase)	N	19.5" × 14.8" × 8.5"	P	28 lbs.	64 × 16 (80 × 24 option)	U,D,R,L	CRT	48k-64k	2 5 ¹ / ₄ " (F) single-sided, double-density
ATHENA COMPUTER	N	14 ¹ / ₂ " × 11 ⁷ / ₈ " × 3 ³ / ₈ "	P	16 lb.	80 × 4	U,D	LCD	64k	1 5 ¹ / ₄ " (F)-single- sided, double- density; 512k internal solid-state storage
CASIO INC. Model FX 700 P	N	6 ¹ / ₂ " × 2 ³ / ₈ " × 3 ³ / ₈ "	H	4.2 oz.	N/A	R,L	LCD	2k	N/A
Model FX 802 P (with built-in printer)	N	6 ⁷ / ₈ " × 3 ¹ / ₂ " × 3 ¹ / ₄ "	H	9.1 oz.	N/A	R,L	LCD	2k	N/A
COMMODORE BUSINESS MACHINES Executive 64 (available fall 1983)	N	24" × 18" × 9"	P	under 20 lb.	40 × 25	U,D,R,L	CRT	64k	1 or 2 built-in 5 ¹ / ₄ " (F), or external drives (H)
COMPAQ COMPUTER CORP. Compaq Portable Computer	Y	20" × 16" × 8 ¹ / ₂ "	P	28 lb.	80 × 25	U,D	CRT	128k-512k	2 5 ¹ / ₄ " (F)
COMPUTER DEVICES DOT	N	15" × 15" × 7.5"	P	28-30 lb.	80 or 132 × 16 or 25	U,D	CRT	64k-704k (above 256k, need another card)	2 3 ¹ / ₂ " SONY micro floppies
COMPUTER SHOP Star-Life	N	16" × 16" × 7 ¹ / ₂ "	P	34 lb.	80 × 24	U,D,L,R and slow scroll mode	CRT	64k	2 5 ¹ / ₄ " (F), single-sided double-density (400k-expandable to hard disk)
COMPUTER SYSTEMS PC/8088	Y	19" × 16 ¹ / ₂ " × 7 ¹ / ₂ "	P	25-30 lb.	80 × 25	U,D	CRT	16k-512k	1 or 2 5 ¹ / ₄ " (F)
CORONA DATA SYSTEMS Corona Portable PC	Y	20" × 20" × 8"	P	30 lb.	80 × 25	U,D,R,L	CRT	128k-512k	1 or 2 5 ¹ / ₄ " (F) (320 kbytes each)
DIGITAL MICROSYSTEMS DMS 3F (The Fox)	N	17.5" × 14.7" × 7.8"	P	30 lb.	80 × 25	U,D	CRT	64k	2 5 ¹ / ₄ " (F)-double- sided, double- density
DMS 15	N	17.5" × 14.7" × 7.8"	P	36 lb.	80 × 25	U,D	CRT	64k	1 5 ¹ / ₄ " (F)-double- sided, double-density 15M Winchester hard disk

*Most portable computers
include a keyboard, display,
disk drives, and software.*

COMMUNICATIONS CAPABILITY? (IF YES, WHAT TYPE?)	NO. AND TYPE OF PORTS	EXTERNAL MONITOR, PRICE	FULL-SIZE KEYBOARD	OTHER PERIPHERALS, PRICES	OPERATING SYSTEM	BUNDLED SOFTWARE (SPECIFY)	PRICE
Y—built-in acoustic coupler and direct-connect modem	1 parallel and bi-directional-Centronics compatible; IEEE 488; 2 RS-232C; composite video output jack; 8" disk drive interface	7" amber (integral)	Y	Built-in dot-matrix printer	CP/M 2.2	Perfect Writer; Perfect Calc; Perfect Speller; Perfect Filer; MBASIC; CBASIC; communications support; system utilities; Fancy Font	\$2495
Y—RS-232 or 300 baud modem (optional)	1 Centronics parallel; RS-232; optional external drive; data bus; cassette port	built-in 9" green, non-glare screen	Y		TRS-DOS		\$2895- (\$795-kit, converts Model III to portable)
Y—serial ports	2 RS-232 C; 1 parallel printer port	N/A	Y		CP/M 2.2	JRT; Pascal; Profitplan; mini Vedit	\$3950
N	N/A	N/A	N	FA-3 cassette interface—\$39.95; FP-12 printer—\$69.95	C-82 Casio BASIC	Fin. Analysis; Coupon Clipper; aviation, math, and engineering; program library for math, science, finance, others	\$99.95
N	N/A	N/A	N	FA-3 cassette interface—\$39.95	C-82 Casio BASIC	same	\$149.95
Y—modem	Expansion/cartridge port; IEEE 488; user RS-232 port; serial; external audio-video port	built-in	Y	Printer—under \$400; VICMODEM—\$100; AUTOMODEM—under \$200	6510; optional Z80 for CP/M	word processor; spreadsheet	from \$995 to \$1495 (depends on configuration)
Y—asynchronous interface	4-parallel printer; GB color monitor; composite video monitor; color or b&w TV modulator; RS-232 port	built-in	Y	IBM-compatible peripherals	MS-DOS	BASIC	\$2995 (128k and 1 floppy disk)
Y-300/1200 baud modem	2 RS-232 ports; RJ 11 phone jack	separate video output jack	Y	160 cps printer (integral)	MS-DOS; CP/M 2.2; Z80 option	3270, 3280 emulation; Multiplan; Word Processor; Time Manager; Data Base	\$2995-base \$4500-128k, 2 drives, printer
Y—RS-232 to connect to modem, optional RS-232 port	1 serial RS-232; Centronics	N/A	Y, with 24 program-mable function keys	IEEE S-100 boards	CP/M	Perfect Writer; Perfect Calc; modem program	\$2695
Y—RS-232 or 422	1 or more RS-232 or 422; IEEE	\$190-mono-chrome, \$500 up-color	Y	Hard disk option—from \$2500; parallel and analog I/O options—from \$200; memory boards—from \$290; Z80 processor—\$500 (with memory); color graphics monitor—\$900	MS-DOS or CP/M	BASIC; skeleton executive	\$3488
Y—built-in serial port	1 serial; 1 built-in parallel port	built-in 9" green screen	Y	Hard disk (10M)—\$2695	MS-DOS; CP/M-86	Multi Mate word processor	\$2395
Y-modem	3 RS-232 serial; 1 RS-422 serial network port		Y		CP/M		\$3995
Y—modem	same		Y		CP/M		\$7495

(continued)

PORTABLE AND HAND-HELD COMPUTERS

COMPANY/ PRODUCT	IBM-COMPATIBLE?	SIZE (CLOSED)	HAND-HELD (H) OR PORTABLE (P)	WEIGHT	DISPLAY SIZE (COLUMNS X LINES)	DISPLAY SCROLL (U,D,R,L)	DISPLAY TYPE	MEMORY SIZE (MIN., MAX.)	NO. AND TYPE DISK DRIVES (H-HARD; F-FLOPPY)
DYNALOGIC INFO-TECH Hyperion	Y	8.3" x 11.3" x 3.6"	P	21 lb.	80 x 25	U,D,R,L	CRT	256k RAM; 8k ROM	2 5 1/4" (F)- double-sided, double-density
EPSON AMERICA INC. HX-20	N	11.375" x 8.5" x 1.75"	P	3 lb. 13 oz.	20 x 4	U,D,R,L	LCD	16k-32k (with expansion unit); 32k ROM-40k (expandable internally, and to 64k with expansion unit)	
GRID SYSTEMS The Compass Computer	Y	15" x 11" x 2"	P	10 lb.	53 x 24	U,D,R,L	elec- tra- lumi- nescent	256k RAM; 384k non-volatile bubble	
HEWLETT-PACKARD HP-41C (CV)	N	5.6" x 3.1" x 1.3"	H	7.2 oz.	12 alpha characters or 10 digits	R,L	LCD	1k-6k 2k-6k (CV)	N/A
HP-75	N	10" x 5" x 1 1/4"	P	26 oz.	32 x 1	U,D,R,L	LCD	64k-160k	
JONOS LIMITED 2100	N	17 1/4" x 13 1/4" x 7 1/4"	P	25 lb.	80 x 25	U,D	CRT	64k-128k	2 3 1/2" SONY micro floppies; third optional internal drive
MICRO SOURCE M600P-Voyager	N	20" x 17" x 7"	P	35 lb.	80 x 24	U,D	CRT	64k	2 5 1/4" (F)-double- sided, double-density
NON-LINEAR SYSTEMS KayPro II	N	18" x 15 1/2" x 8"	P	26 lb.	80 x 25		CRT	64k	2 5 1/4" (F)
OSBORNE COMPUTER CORP. The Executive	Y	20.5" x 13" x 9"	P	28 lb.	80 x 24 (80 x 25 option with coprocessor)	U,D	CRT	128k (256k with coprocessor)	2 5 1/4" single- sided, double-density drives (H)
Osborne I	N	20.5" x 14.5" x 8.5"	P	26.7 lb.	52 x 24	U,D,R,L	CRT	64k	2 5 1/4" (F) single-sided, single density
OTRONA ADVANCED SYSTEMS The Attache	N	13.6" x 12" x 5.75"	P	18 lb.	80 x 24	U,D	CRT	64k	2 5 1/4" double-sided double-density (F)
PANASONIC The Link-Model RL-H 1400 (Model RL-H 1800)	N	8 5/16" x 3 3/4" x 1 3/16"	P&H	14 oz.	159 x 8 dot, 26 character	N/A	LCD	4k (8k)	N/A
PERIPHERAL SYSTEMS Eagle	N	18" x 17" x 8"	P	18 lb.	80 x 24	U,D	CRT	64k-156k (CMOS battery backup)	2 SONY micro floppies

Portable computers offer the combined virtues of complete portability and low cost.

COMMUNICATIONS CAPABILITY? (IF YES, WHAT TYPE?)	NO. AND TYPE OF PORTS	EXTERNAL MONITOR, PRICE	FULL-SIZE KEYBOARD	OTHER PERIPHERALS, PRICES	OPERATING SYSTEM	BUNDLED SOFTWARE (SPECIFY)	PRICE
Y—300 baud internal modem	1 serial; 1 parallel	use with all monitors	Y	Other programming languages available	MS-DOS	Microsoft advanced disk BASIC; MultiPlan; Executive Text Editor; electronic mail terminal; telephone management system	\$4995
Y—RS-232C plus serial port	2 communications ports; bar code reader; cassette, system bus; ROM cartridge; microcassette interface	built-in	Y	ZX-20-AA acoustic coupler—\$165	Microsoft BASIC		\$795
Y—built-in 212A and 103 modems	IEEE 488; RS-232; RS-422		N	Floppy/hard disk combination—\$4100; dot-matrix printer—\$850; telephone hand set—\$60	PCOS	GRIDPLOT; GRIDPLAN; GRIDFILE; GRIDWRITE; GRIDTERM—\$900 (optional)	\$8150
N	4-HPIL interface loop (module)	\$295	N	Plug-in card reader—\$195; Printer/Plotter—\$385; Optical Wand—\$125	reverse Polish notation (RPN)		\$195 (\$275-CV)
Y—HPIL interface loop; modems	1—for interface loop	\$295	N	Printers—from \$450; plotters—from \$1550; digital cassette drive—from \$450	HP-BASIC	Editing; personal finance; file manager; games	\$995
Y—optional, with a modem	2 RS-232 serial; optional Centronics parallel port	built-in 9" green, non-glare screen	Y	Attachable printer—\$695; STD bus card options (8 slot STD bus card cage with 5 open slots standard in unit); battery pack option; leather case option	CP/M	CP/M; MBASIC 80; Multiplan; Spellbinder; Spellcheck	\$3995
Y—serial; port	1 RS-232 serial; 1 parallel printer port	N/A	Y	Hard drive—\$2495; 300 baud acoustic coupler—\$350; external 8" disk drive—\$949	CP/M 2.2	Utilities; Archivist; word processor; data base manager; spreadsheet; compiler; FORTH; others	\$3900
Y—RS-232C interface	1 RS-232C; 1 parallel	9" diagonal	Y		CP/M 2.2	Perfect Writer; Perfect Speller; Perfect Calc; Perfect Filer	\$1795
Y	2 serial ports (asynchronous and RS-232C); IEEE port	7" diagonal	Y	Bell 103 auto-dial, auto-answer modem—\$265 (includes software)	CP/M + or UCSDP	WordStar; MailMerge; SuperCalc; CBASIC; MBASIC; Executive Data Manager	\$2495 (Z80 version) from \$3095 (coprocessor version)
Y—modem port	1 serial; 1 IEEE; ext. video battery port	5" diagonal	Y	modem	CP/M		\$1795 \$1995 with 2 single-sided, double-density disks
Y—modem	1 RS-232C; party line connection to other computers; 2 identical full-function ports	5" diagonal, built-in	Y		CP/M	WordStar Plus; BASIC; VALET; CHARTON	\$3995
Y—telephone modem	I/O adaptor; RS-232 interface; TV adaptor	use with TV	Y	Asynchronous modem—\$250; TV adaptor (color/graphics)—\$349; 40-character printer—\$300; 8k or 16k RAM expansion packs—\$250, \$350; modem with cassette interface—\$300; X-Y 4-color plotter—\$480	SnapFORTH		\$380 (\$480)
Y—serial ports	2 serial; 1 parallel	\$300	Y	300 baud modem—\$250; memory expansion to 256k—\$1000	CP/M or TASK	spreadsheet; word-processing; speller; inventory	\$3495

(continued)

PORTABLE AND HAND-HELD COMPUTERS

COMPANY/ PRODUCT	IBM-COMPATIBLE?	SIZE (CLOSED)	HAND-HELD (H) OR PORTABLE (P)	WEIGHT	DISPLAY SIZE	DISPLAY SCROLL (U,D,R,L)	DISPLAY TYPE	MEMORY SIZE (MIN., MAX.)	NO. AND TYPE DISK DRIVES (H-HARD; F-FLOPPY)
PERSONAL MICRO COMPUTERS PMC MicroMate	N	13"×6"×3 1/2"	P	8 lb.	80 × 24	U,D	CRT	128k RAM; 4k ROM	Can operate with any combination of 4 5 1/4" (F), single/double-sided, single/double-density disk drives
QUASAR CO. HHC HK 2500 (2k) HHC HK 2600 (4k) HHC HK 2608 (8k)	Y	9"×3 3/4"×1 1/4"	H	1 lb. 4oz.	26 characters	U,D	LCD	2k,4k,8k	N/A
RADIO SHACK PC1	N	6 7/8"×2 3/4"×1 1/16"	H	6 oz.	24 characters	U,D,R,L	LCD	1.9k	N/A
PC2	N	7 11/16"×3 3/8"×1 1/16"	H	16 oz.	26 characters	U,D,R,L	LCD	2.6k-10.6k	N/A
TRS-80 Model 100	N	11 7/8"×8 1/2"×2"	P	4 lb.	40 × 8	U,D	LCD	8k-32k	
SEEQUA COMPUTER CORP. The Chameleon	Y	18"×16"×8"	P	28 lb.	80 × 25	U,D	CRT	128k-256k plus expansion box	2 5 1/4" single-sided, double-density (F); hard disk through expansion box
SHARP ELECTRONICS CORP. PC 1250	N	5 5/16"×2 3/4"×3 3/8"	H	115 grams	7 × 24	N/A	LCD	2.2k	N/A
PC 1500	N	7 11/16"×3 3/8"×1"	H	375 grams	7 × 24	N/A	LCD	2.2k-8k	N/A
STM ELECTRONICS CORP. Pied Piper	N	20"×11"×4"	P	12.5 lb.	80 × 24 (or 40 × 24)	U,D (U,D,R,L)	optional LCD, 80 col. × 2 lines	64k	1 built-in disk drive—784k formatted with I/O and power as standard in second drive (10M-H or 1 M-F)
TELCON INDUSTRIES INC. Zorba	Y	17 1/2"×16"×9"	P	22 lb.	80×25 (7" screen)	U,D,R,L	CRT	64k	2 (F), double-density, double-sided
Nomis 9	Y	17 1/2"×16"×9"	P	23 lb.	80×25 (9" screen)	U,D,R,L	CRT	64k-upgradable	same
TELERAM COMMUN. CORP. Teleram 3000 Model I (II)	N	13"×9.75"×3.45"	P	8 lb. 13 oz.	80×4	U,D	LCD	64k	internal bubble memory modules—128k bytes (256k bytes)
TEXAS INSTRUMENTS Compact Computer 40	N	9 1/2"×5 3/4"×1"	H	22 oz.	31 characters	U,D,R,L	LCD	6k ROM 34k ROM	
TIMEX COMPUTER CORP. Timex Sinclair 1000	N	6 7/8"×6 3/8"×1 3/8"	P	12 oz.	32×24	U,D	CRT	2k-16k (with accessories)	

Generally, portable computers provide more computing power than the hand-held variety.

COMMUNICATIONS CAPABILITY? (IF YES, WHAT TYPE?)	NO. AND TYPE OF PORTS	EXTERNAL MONITOR, PRICE	FULL-SIZE KEYBOARD	OTHER PERIPHERALS, PRICES	OPERATING SYSTEM	BUNDLED SOFTWARE (SPECIFY)	PRICE
Y—RS-232C	2 serial asynchronous ports; 4 high-speed, bidirectional, parallel ports; 1 Centronics-compatible parallel printer port; connector for additional disk drives		can be used with any terminal	Operates with any external peripherals that use either an asynchronous serial (RS-232C) or 8-bit parallel interface, Centronics interface	CP/M+: compatible with CP/M 2.2	T/Maker III—includes spreadsheet, word processing and text editing, list processing, file management, data transfer	\$1495 (incl. terminal) \$995 (without terminal)
Y—acoustic coupler/modem	1 serial port; I/O adaptor for interfacing up to six peripherals	TV adaptor—\$295	N	I/O adaptor—\$150; RS-232C interface—\$250; microprinter—\$225; miniprinter—\$295; four-color plotter/printer—\$475; acoustic coupler/modem—\$250; cassette interface/modem—\$295; TV adaptor—\$295; program-mable memory, 4k—\$150, 8k—\$250, 16k—\$350; attache case—\$170	SnapFORTH; Snap-BASIC; Microsoft BASIC; Portaflex	available at additional cost	\$329 (2k) \$379 (4k) \$479 (8k)
N	N/A	N/A	N	Cassette interface—\$29.95; Printer interface—\$127.95	BASIC		\$149.95
Y—RS-232 interface	N/A	N/A	N	Printer cassette interface—\$219.95 (4-color graphics)	BASIC		\$199.95
Y—built-in 300 baud modem plus telecommunications software	1 RS-232 serial; 1 parallel port; telephone jack		Y	to be introduced	Microsoft BASIC	Text editor; scheduler; address handler; communications program	\$799 (8k) \$999 (24k) optional 8k RAM—\$119.95 plus installation
Y—serial ports	1 serial; 1 parallel; IEEE 488; RGB; composite video; expansion port	use with all monitors	Y	Expansion chassis—\$795	MS-DOS; CP/M-86; CP/M-80; CP/M+	MS-DOS; Perfect Writer; Perfect Calc; BASIC	\$1995
N		N/A	N	Printer interface—\$170	CPU		\$110
Y—to RS-232 interface		N/A	N	Printer interface—\$230	CPU	ROMware—\$65	\$220
Y—optional serial board with RS-232; modem	1 parallel port	use with all monitors	Y	2 serial boards—under \$300; hard disks—under \$2500; floppy disks—under \$500; LCD display—under \$400	CP/M	Perfect Writer; Perfect Calc; Perfect Speller; Perfect Filer; single drive disk and file copy; PV (40 column screen); Prepare	\$1299
Y—RS-232	4-RS-232; IEEE 488; RS-232 serial or parallel PIA	\$95	Y	cluster controller—\$58.75 (8 channel); \$69.95 (16 channel) for networking	CP/M 2.2	WordStar; CalcStar; MailMerge; CBASIC; M80; SourceCode	\$1995 (incl. software)
same	same	same	Y	same	same	same	approx. \$2400
Y—asynchronous	1 RS-232C; 1 parallel data bus for expansion	available 4/83	Y	Full screen monitor; floppy drives; additional interface ports—available 4/83	CP/M	CP/M-80; ASSIGN utility; DEFAULT utility; KEYDES utility; TeleTalk communications package	\$2995 (\$3595)
Y—modem available soon	HEX-bus	N/A	N	RS-232 interface (HX 3000)—\$99.95; 4-color printer/plotter (HX 1000)—\$199.95; digital tape drive (48k)—\$139.95 (HX 2000)	TI operating system	22 application packages	\$249.95
Y—modem to be introduced	1	TV-compatible	N	TS 2040 printer—\$99.95; Timex Sinclair 1016 RAM module (16k)—\$49.95	Sinclair BASIC		\$99.95

(story continues on page 165)

Say Goodbye to Computer Under-Use!



Say Hello to Condor Database!

**Now you can do hundreds of tasks quickly and easily
without programming experience.**

We know the frustrations. You bought a microcomputer to help manage your business better. Then came the realities of software—canned programs, computer languages, programmers and consultants. Finally, you got something running... but it's not what you wanted. To make matters worse, the computer is sitting idle much of the time. And you expected to be able to do so much more.

Condor to the rescue

Condor has a management system for your microcomputer that helps you accomplish hundreds of tasks . . . quickly and easily . . . **without programming experience.** Called Condor Database, it truly helps you do most of the things that prompted you to buy a computer in the first place. Simple things like reminding you of important dates or setting up zip code sorted mailing lists. Or intermediate tasks like organizing your files, project control and customer tracking. Or more complex applications like analyzing cash-flow and generating extensive management reports. All are accomplished with less time and effort with Condor. Much less!

Easy to use with fast results

Condor Database eliminates complex programming. It uses simple English words to do the things

you want to do. You'll be amazed how quickly Condor helps manage your business, even if you're a first-time user. No wonder many of the largest hardware manufacturers have tested and feature Condor Database with their microcomputers. Companies like Zenith, Hewlett-Packard, DEC, NEC, Sony, Sanyo and Monroe.

\$295 with a money-back guarantee

More good news. Condor Database helps you grow in steps. Start with Condor 1—the file manager for just \$295. As your needs grow, buy Condor 3—the complete database manager for \$650. Both come with an easy-to-use manual and a full 30-day money back guarantee. We'll even discount the Condor 3 price \$245 when you upgrade from Condor 1. For full information, see your local software dealer or contact us. You've got a world of useful applications to gain. And nothing to lose except your frustrations.

P.S. If you're about to buy a microcomputer, buy it with Condor Database to start. You'll avoid frustration in the first place!

NOTE: Compatible with all microcomputers with CP/M, MSDOS, CP/M-86, MP/M, PC DOS or TURBODOS



CONDOR COMPUTER CORPORATION

2051 S. State Street
Ann Arbor, Michigan 48104
(313) 769-3992

Condor Database — it's simply better!

GSA Schedule. Contact 1828 L. Street, N.W., Suite 117, Washington, D.C. 20036 Phone (202) 466-8551

What's unique about the GE 3000 printer family is its commonality.

"They're all the same only different." That's the simple advantage of General Electric's new GE 3000 series of printers...single design simplicity without the application limitations of a single model product line.

Our basic concept is application driven price/performance matching. Choose speeds from 40 to over 400 cps. Single or dual mode printing. Type quality from EDP to NLQ. Multi-color printing. Graphics. 80 and 136 column models. Selectable type fonts. Accessible, easily programmable set-up by either the operator or the system. Multi-model flexibility...all with high parts commonality.

Now, you can stock just one line of printers, yet meet a diversity of needs. Enjoy every advantage of single source supply. With each printer backed by General Electric's world-wide service.

Take a close look at any of the GE 3000 printers. You'll find they're easy to use, lightweight, functionally styled, reliable tabletop matrix printers. And when you take the entire GE 3000 series altogether, they stack up beautifully compared to everything else on the market today.

General Electric. We introduced the first fully electronic printer with LSI circuitry in 1969. And our complete line today makes us the industry leader you should look to first.



First In Electronic Printing.

For the solution to your printing needs, call
TOLL FREE 1-800-368-3182

General Electric Company, Data Communication Products Department B321, Waynesboro, VA 22980. In Virginia, call 1-703-949-1170.

GENERAL  ELECTRIC

Getting The Best From Data Banks

Data-base retrieval systems can be a valuable tool for any growing business

by Marvin Grosswirth

Among the myriad acronyms and initials plaguing the world of computers, DBRS may be somewhat less memorable than some. It may be easier to remember, however, if one thinks of it as DBR\$.

The initials stand for "data-base retrieval system," a computerized service that's giving the competitive edge to thousands of executives, managers, entrepreneurs, and professionals by providing valuable information at low cost in a matter of minutes—information that would otherwise be available only through dogged, time-consuming, and expensive research if at all.

That information is contained in data bases, or data "banks," electronic libraries of millions of facts that can be selected, arrayed, arranged, saved, analyzed, and updated. Some of the information is so time-sensitive that many data bases are updated daily or even hourly. (DBRSs are sometimes called "on-line data bases" or "on-line data banks," but those terms are inaccurate, because many data bases are "on-line" only to authorized personnel of the organizations that own them.)

Law, medicine, corporate profiles, agribusiness, technical and professional journals in 40 languages, con-

sumer buying habits, solar energy, financial management and planning, coal, oil, and forestry resources, commodities, pharmacology, aquatic sciences, alcoholism, Latin America, the Middle East, money markets, stock markets, supermarkets, and even the fertilizer market—these, and some 600 more fat files of "live" data are available. And all that is required to obtain the specific information is access to a personal computer or a terminal, a modem, communications software, and a telephone. Subscribers to DBRSs can "log on" to the services' mainframe computers and use the facilities of the big machines in a number of ways, not only in the handling of information, but, in some instances, for electronic mail and for computing power above and beyond the capabilities of their personal computers. Frequently, the DBRS's computer serves as a "front-end communicator," linking the subscriber's computer with the data-base owner's.

The data bases are usually independently owned—by an individual, a corporation, a news service, a government agency—and made available, over public or private communications carriers, by "vendors" who provide the DBRS. The vendor charges the user (known as a subscriber) a fee, and pays the data-base owner a royalty for each use.

This is no small-time business.

Three of the best-known vendors are subsidiaries of large corporations who have years of experience in selling information. The Source is owned by The Reader's Digest Association, CompuServe is a subsidiary of H. & R. Block, and DIALOG is the property of Lockheed Corp. Boeing, General Electric, McGraw-Hill, Chase Manhattan Bank, Dow Jones, TRW, and Dun & Bradstreet are just a few of the major corporations sharing the profits to be gained by providing information services to other business operations, both great and small.

A better barrister

Chicago attorney Steve Bashaw has been practicing law for seven years, and has been a regular DBRS user for the last two years. He claims that using a DBRS has made him a better lawyer and has brought him more clients. Bashaw estimates that 85 to 90 percent of his practice is devoted to representing "mortgage houses—savings and loan associations, mortgage bankers, insurance companies that invest in mortgages . . . Mortgage law, mortgage litigation—real estate mortgage foreclosures—are my specialty," he explains. "These are very heavily impacted by federal regulations.

"We do a newsletter for our clients
(continued on page 115)

(chart begins on the next page)

Marvin Grosswirth is a New York-based free-lance writer who specializes in computers.

A LISTING OF SOME ON-LINE DATA BASES

ACCOUNTANTS' INDEX

Provider: American Institute of Certified Public Accountants
On-line through: SDC Search Service
Subject: Information for accountants

ADTRACK

Provider: Corporate Intelligence, Inc.
On-line through: Dialog Info. Services, Inc.
Subject: Ads in print

AGRICOLA

Provider: U.S. Department of Agriculture
On-line through: BRS Inc.; Dialog Information Services, Inc.
Subject: Literature on agriculture

AGRICULTURE

Provider: Data Resources, Inc.
On-line through: Data Resources, Inc.
Subject: Agricultural economic data

AGRICULTURE FORECAST

Provider: Chase Econometrics/Interactive Data Corp.
On-line through: Chase Econometrics/Interactive Data Corp.
Subject: Agricultural economic data

AMERICAN PROFILES

Provider: Donnelley Marketing
On-line through: National CSS
Subject: 1980 Census demographic data

AUERBACH COMPAR

Provider: Auerbach, The Information Company
On-line through: BRS Inc.
Subject: Data-processing products

BALANCE OF PAYMENTS

Provider: International Monetary Fund
On-line through: Chase Econometrics/Interactive Data Corp.; Data Resources, Inc.; Rapidata, Inc.
Subject: International economic transactions

BILLBOARD INFORMATION NETWORK

Provider: Billboard Information network
On-line through: Billboard Information Network
Subject: Play listings from 400 radio stations

BOOK REVIEW INDEX

Provider: Gale Research Company
On-line through: Dialog Info. Services, Inc.
Subject: Periodical and book reviews

BOOKS IN PRINT

Provider: R.R. Bowker Company
On-line through: BRS Inc.
Subject: Books currently in print

CALL/SINKING FUND PROVISIONS

Provider: Chase Econometrics/Interactive Data Corp.
On-line through: Chase Econometrics/Interactive Data Corp.
Subject: Call and sinking fund characteristics for bonds

CHASE ECONOMETRICS/INTERACTIVE DATA CORP.

Provider: Chase Econometrics/Interactive Data Corp.
On-line through: Chase Econometrics/Interactive Data Corp.
Subject: Wide range of financial and economic data bases

CSS/QUOTES+

Provider: National CSS
On-line through: National CSS
Subject: Stock history data base

COMMODITIES FUTURES

Provider: Market Data Systems, Inc.
On-line through: General Electric Information Services Co.
Subject: Commodity futures contracts

COMPUSERVE INFORMATION SERVICES

Provider: CompuServe Inc.
On-line through: CompuServe Inc.
Subject: Multifaceted information service providing many data bases

DOW JONES NEWS/RETRIEVAL SERVICE & STOCK QUOTE REPORTER

Provider: Dow Jones & Co.
On-line through: Dow Jones & Co.
Subject: Business news and stock prices

DRI CAPSULE

Provider: Data Resources, Inc.
On-line through: I.P. Sharp Associates; United Information Service
Subject: Time series on economic indicators

FOUNDATIONS

Provider: The Foundation Center
On-line through: Dialog Info. Services, Inc.
Subject: Non-profit foundations

HARVARD BUSINESS REVIEW

Provider: Harvard Business Review
On-line through: BRS Inc.; Dialog Information Services, Inc.
Subject: Abstracts and comprehensive indexing of all articles in HBR from 1971 to present, plus some older articles; full texts available for articles from 1976

HORSE

Provider: Bloodstock Research Statistical Bureau
On-line through: Bloodstock Research Statistical Bureau
Subject: Thoroughbred pedigrees, breeding records, race records

ICC

Provider: Interstate Commerce Commission and Federal Railroad
On-line through: The Computer Company
Subject: Traffic and financial data

INTERNATIONAL SOFTWARE DATA BASE

Provider: Imprint Software Ltd.
On-line through: Dialog Information Services, Inc.; Knowledge Index
Subject: Microcomputer software

LEGAL RESOURCE INDEX

Provider: Information Access Corp.
On-line through: Dialog Info. Services, Inc.
Subject: Citations to law and law-related literature

LEGI-SLATE

Provider: Legi-Slate
On-line through: I.P. Sharp Associates
Subject: Contains complete history of all bills and resolutions introduced during regular and special sessions of U.S. Congress

MEDLINE

Provider: National Library of Medicine
On-line through: Dialog Information Services, Inc.; BRS Inc.; National Library of Medicine
Subject: Worldwide biomedical literature

MICROCOMPUTER INDEX

Provider: Microcomputer Index
On-line through: Dialog Information Services, Inc.; Knowledge Index
Subject: Microcomputer magazines

NATIONAL TECHNICAL INFORMATION SERVICE

Provider: National Technical Information Service
On-line through: BRS Inc.; Dialog Information Services, Inc.
Subject: Unclassified reports on government and non-government sponsored engineering and scientific research

SOCIOLOGICAL ABSTRACTS

Provider: Sociological Abstracts, Inc.
On-line through: Dialog Info. Services, Inc.
Subject: Abstracts of sociological literature

THE SOURCE

Provider: Source Telecomputing Corporation
On-line through: The Source, Source Telecomputing Corp.
Subject: Contains many information services

STANDARD AND POOR'S INDUSTRY FINANCIAL DATA BANK

Provider: Data Resources, Inc.; Standard and Poor's Corp.
On-line through: Data Resources, Inc.
Subject: Time series on industry groups

This listing is, in part, based on information from the *Directory of Online Databases* published by Cuadra Assoc., Inc., 2001 Wilshire Blvd., Suite 305, Santa Monica, CA 90403, (213) 829-9972

*DBRSs can offer measurable benefits
to most business people—if they
select their DBRSs with care.*

ON-LINE SERVICES

BILLBOARD INFORMATION NETWORK

1515 Broadway
New York, NY 10036
(212) 764-7300
Connect charge: \$200, incl. training (deferred for home use)
Report charge: 25¢ to \$5 each
Time charge: 40¢/minute

BLOODSTOCK RESEARCH STATISTICAL BUREAU

801 Corporate Drive
P.O. Box 4097
Lexington, KY 40544
(606) 278-0411
Charge: \$1.75 to \$16.50 per pedigree

BRS INC.

1200 Route 7
Latham, NY 12110
(800) 833-4707
Subscription: Charge depends on contract commitment
Telecommunications fee: \$6 to \$11/hr, depending on network
Connect charge: \$16 to \$30/hr plus royalties and telecommunications
Royalties: Charge determined by producer
Open access plan: \$35/hr plus royalties and telecommunications; \$50 start-up fee, credited to account

CHASE ECONOMETRICS/INTERACTIVE DATA CORPORATION

486 Totten Pond Road
Waltham, MA 02154
(617) 890-1234
Subscription: Depends on individual data base
Connect charge: \$19.75/hr
Time charge: 16¢ per unit on-line, 8¢ overnight

COMPUSERVE INCORPORATED

5000 Arlington Centre Blvd.
Columbus, OH 43220
(800) 848-8990
Subscription: \$39.95, includes five introductory hours
Connect charge: \$5/hr, no monthly minimum; \$22.50/hr prime time, two-hour monthly minimum; includes communication network

THE COMPUTER COMPANY

1905 Westmoreland St.
Richmond, VA 23230
(804) 358-2171
Connect charge: \$1/hr
Other charges: 55¢ per 1000 characters; 25¢ per CRU

DATA RESOURCES, INC.

24 Hartwell Ave.
Lexington, MA 02173
(617) 863-5100
Subscription: Depends on individual data base
Connect charge: \$22.75
Time charge: 7.2¢ per CRU

DIALOG INFORMATION SERVICES INC.

3460 Hillview Ave.
Palo Alto, CA 94304
(800) 227-1927; (800) 982-5838 in CA
Time charge: \$15 to \$100/hr

DOW JONES & CO.

P.O. Box 300
Princeton, NJ 08540
(800) 257-5114
Subscription: Standard—\$1.20/minute prime time, 20¢/minute non-prime, for news; 90¢/minute prime time, 15¢/minute non-prime, for quotes. Blue Chip—for non-prime-time users; lower rates. Executive—\$50/month; lower prime-time rates.
Connect charge: \$50

DUN & BRADSTREET, INC.

99 Church St.
New York, NY 10007
(212) 285-7669
Subscription: Contract required. Charge depends on number of units (one per report); minimum contract depends on type of service.
Access charge: Depends on type of contract purchased

GENERAL ELECTRIC INFORMATION SERVICES

401 N. Washington St.
Rockville, MD 20850
(301) 340-4000
Subscription: \$40 to \$50/month
Connect charge: \$3 to \$45/hr, depending on type of terminal device used and baud rate
Time charge: 16¢ per CRU; up to 10¢ per 1000 characters

I.P. SHARP ASSOCIATES

2 First Canadian Place
Exchange Tower, Suite 1900
Toronto, Ont., Canada M5X 1E3
Connect charge: 25¢ to 45¢ CPU charge; 70¢ per 1000 characters
Time charge: \$1/hr

KNOWLEDGE INDEX

3460 Hillview Ave.
Palo Alto, CA 94304
(800) 227-5510; (415) 858-3796
Subscription: \$35
Connect charge: \$24/hr, including network fees

NATIONAL CSS

187 Danbury Road
Wilton, CT 06897
(203) 762-2511
Minimum charge: \$300/month
Connect charge: \$17/hr including telecommunications
Time charge: 27¹/₂¢ per application resource unit (ARU)

NATIONAL LIBRARY OF MEDICINE

8600 Rockville Pike
Bethesda, MD 20209
(301) 496-6661
Minimum charge: \$15/month
Connect charge: \$22/hr prime time, \$15/hr non-prime time; telecommunication charges included

RAPIDATA, INC.

20 New Dutch Lane
Fairfield, NJ 07006
(201) 227-0035
Minimum charge: \$100/month
Connect charge: 16.7¢/minute; national toll-free access
Time charge: 30¢/minute, 300 baud; 50¢/minute, 1200 baud

SOURCE TELECOMPUTING CORP.

1616 Anderson Road
McLean, VA 22102
(800) 336-3366
Subscription: \$100, includes user's manual, lifetime subscription to newsletter and other publications
Connect charge: None in 480 cities; toll-call charge for outlying regions
Time charge: \$20.75/hr prime time; \$7.75/hr non-prime time; \$5.75/hr economy rates.

UNITED INFORMATION SERVICE

5454 West 110th St.
Overland Park, KA 66211
(913) 341-9161
Subscription: \$200 to start, \$300/month minimum; catalog maintenance fee
Connect charge: Option A—10 to 30 characters per second (cps), \$10.50/hr plus 21¢ per kilocharacter (kch) input or output; 120 cps, \$20.50/hr plus 21¢ per kch. Option B—10 to 30 cps, \$15.50/hr plus 27¢ per kch; 120 cps, \$25.50/hr plus 27¢ per kch.

*CRU designates computer resource unit

(continued)

Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • XEROX™



The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

VERSARECEIVABLES™ \$99.95

VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

VERSAPAYABLES™ \$99.95

VERSAPAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSAPAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSAPAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSAPAYROLL™ \$99.95

VERSAPAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSALEDGER II™ system.

VERSAINVENTORY™ \$99.95

VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™ \$149.95

VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

- VERSALEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module.

To Order:

Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

- * add \$3 for shipping in UPS areas
- * add \$4 for C.O.D. or non-UPS areas

- * add \$5 to CANADA or MEXICO
- * add proper postage elsewhere

DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability.

COMPUTRONICS

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10977

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. • APPLE is a trademark of Apple Corp. • IBM is a trademark of IBM Corp. • OSBORNE is a trademark of Osborne Corp. • CP/M is a trademark of Digital Research • XEROX is a trademark of Xerox Corp.

He believes his use of the DBRS is responsible for a significant growth in business.

DATA BANKS

(continued from page 111)

about every 45 days," Bashaw continues. "When I'm getting ready to do the newsletter, I review all the news that has an impact. I excerpt from that and make comments about it, and advise my clients about what's going on." In the old days, before DBRS, Bashaw tried to be diligent about checking and clipping the daily newspapers, with varying success. When it came time to prepare his newsletter, he was confronted with file folders filled with ragged, rapidly yellowing clippings. Then he discovered personal computers and, shortly after, DBRS.

After a typical 12-hour day at the office, Bashaw goes home, does whatever a mortgage lawyer does when he gets home, and around midnight, sits down at his Apple and "logs on" to his DBRS. "I keyword-search UPI (United Press International) under the word 'mortgage' and pull in any and all articles that mention the word . . ." If he misses a night, the data base fills him in on what happened the day before. First, he gets a headline synopsis of available articles so that he can select the ones he wants to read. "If they're good, I capture them in a buffer," he explains, for printing out hard copies after he "logs off." Actually, he doesn't have to do that; the DBRS will mail him hard copies if he requests it (for a fee, of course, but a relatively nominal one). He also searches other news data bases for relevant national, business, regional, and congressional events that could affect his clients.

Bashaw believes his use of the DBRS is responsible for a significant growth in business. The quality of his newsletter, which is, after all, generated by his data-base searches, has enhanced his reputation as an expert. As a result, there has been a marked increase in the number of speaking invitations he receives. That, he claims, has increased his exposure and, therefore, his clientele. His firm,

Pierce & Bashaw, currently oversees the Illinois holdings of national clients, but he plans to expand his activities into other states. He can do this because of his expertise on federal and state mortgage laws—expertise he has developed by keeping abreast of the field via his DBRS.

Portfolios with DBRS

Bashaw also uses the DBRS to take care of his personal business. "About a year ago," he says, "I chose to invest my IRA funds in stocks." Now he uses the DBRS to stay abreast of his portfolio as well as the stock market in general. "I save my stock prices on my buffer," he explains. "When I log off, I bring up my VisiCalc [spreadsheet program] and plug in the current prices. I press a button and change the value of the current price on my matrix, and it lets me know how I'm doing." Bashaw is on-line almost every weeknight. His average time: 24 minutes.

The researching capabilities of a DBRS have had a powerful impact on Tom Trone's business, too. Trone is co-owner (with John Kiser) of Lox, Stock & Bagel, a chain of three restaurants in Champaign and Normal, Ill., with ambitious plans for future expansion.

The restaurants are sort of eat-in gourmet delicatessens, and while they would appear to be quite similar, there are differences among them. One is located on a university campus, another in a downtown business district, and a third in a regional shopping mall. (Five more are now "on the drawing board," according to Trone; ultimately, there will be 14.) "We have three different markets and three different customer profiles," Trone says. So while the menus may look the same, the rates of consumption of the various items are likely to be different. That, in turn, affects pricing and profit. Pricing and profit are carefully monitored by Lox, Stock & Bagel—mostly through a DBRS. About a year ago, when

HOW TO FIND ON-LINE DATA BASES

Although finding facts through a DBRS is easy, finding the right data base can sometimes be a problem. Some suggestions to aid you in your search:

Ask the executive director or secretary of your trade association or professional society. Many such organizations have their own DBRSs or can recommend ones that are directly related to your work. Also ask around among your colleagues. Most people who use DBRSs like to brag about it.

Write or telephone the large DBRSs and ask about data bases that serve your specific needs. Chances are you'll find what you're looking for among one of these three: CompuServe Inc., 5000 Arlington Centre Blvd., Columbus, OH 43220, (800) 848-8990; Source Telecomputing Corp., 1616 Anderson Rd., McLean, VA 22102, (703) 734-7500 or (800) 336-3366; and Dialog Information Services, Inc., 3460 Hillview Ave., Palo Alto, CA 94304, (800) 982-5838 (CA) or (800) 227-1927.

Pick up a copy of *Data Bases for Business* by Van Mayros and D. Michael Werner (Chilton Book Co., Radnor, PA, 1982; \$19.95 paperback, \$27.50 hardbound), an excellent guide to using DBRSs. In addition to a full explanation of what DBRSs are and how to use them, the book contains a directory of about 400 DBRSs with details such as names, addresses, telephone numbers, the vendors through which the services are available, and cross-referenced indexes so that you can find the data bases by name, by vendor, or by type of business or service.

There are other, similar database directories that tend to be larger and more expensive. Check the business section of your local public library, or, if you work for a large organization, talk to your company librarian.

IBM compatible . . .



Go first class . . . with your peripherals, too!

Your IBM personal computer deserves the finest, fully compatible peripherals, like Amdek's high resolution Color II Monitor . . . the new comfort-view Model "Video-310A" amber monitor . . . or the new revolutionary AMDISK-3 Micro-Floppydisk Drive with up to 1 Megabyte storage! Just call, or write for full details on these high-performance Amdek peripherals.

- Color II Monitor, 13", 560(H) x 240(V) line resolution, 80 x 24 character display.
- Model "Video-310A" amber phosphor screen with TTL video input. Connecting cable included.
- "AMDISK-3" Micro-Floppydisk Drive, 1 Megabyte (unformatted) storage, track-to-track compatible with 5 1/4" drives, shirt-pocket size Micro-Floppydisk Cartridge.

2201 Lively Blvd. • Elk Grove Village, IL 60007
(312) 364-1180 TLX: 25-4786

AMDEK CORP.

Amdek . . . your guide to innovative computing!

The DBRS's most important competitive advantage is its communications feature—electronic mail.

BUSINESS

Trone first began using The Source, he explains, "we were in the process of making up new pricing scheduling, looking at our purchasing decisions and prices that we could lock in. We tied in to the Commodity News Network. From that, we got information about grain price movements, meat price movements, and so on. We actually make decisions on future purchasing and pricing based on information that we get through The Source."

Trone also uses his DBRS for what he calls "basic research." "In the process of expansion," he says, "we need a lot of information. In a town like Champaign, or in any community, it's difficult to get a broad base of information to make decisions with. The Source brings that information right here into the office. We use their research bases, where we can go in and research a topic of very broad scale, over a wide range of information bases, right here." Trone would not discuss which broad-scale topics he reviews, but certainly, if he plans to open restaurants, he will be looking at economic trends, consumer eating habits, area demographics, and other considerations necessary for determining whether, where, and how to establish a restaurant. All that information is available on DBRSs. "We can get information that deals specifically with what we're doing and can save us the old trial-and-error process. At least when we do a trial now," he says, "it's going to be an educated one."

Getting market updates

Michael Merker also uses a DBRS to monitor economic trends that relate to his business. Merker is the manager of a Xerox retail store in Great Neck, N.Y. Although the store, one of a chain of 52 outlets, is owned by Xerox, Merker is expected to run it as though it were his own business. Thus, while the company dictates the line of products to be carried—which consists of a full line of office ma-

chines, including the Xerox copiers and the 820-II personal computers—it's Merker who's responsible for sales, advertising budgets, promotions, and special offers.

"I use the business update on a regular basis," Merker says, "just to keep up with what's happening in the market. I can't always get to read the entire *Wall Street Journal* every morning—the DBRS allows me to look around and monitor what's going on in retail and the business community as a whole. If everything indicates, for example, that there's a recession, I know I should cut back on my inventory levels and perhaps stress my sale items a bit more—alter my advertising strategies. It allows me to change my 'head set.'"

But for Merker, the DBRS's most important competitive advantage is its communications feature—electronic mail. A "sender" can transmit a message to the central DBRS computer which the "receiver" can access whenever it's convenient. Inasmuch as all 52 Xerox stores are on the DBRS, Merker can play all sorts of inventory games. "There are times," he admits, "when I'll take an order here and I just physically don't have the merchandise. If I go through my normal ordering system (through a mainframe computer in Dallas) . . . it takes a week and a half for the merchandise to arrive But if I use my distribution list, I can send a 'letter' to all 52 stores and say, 'I need 50 Toshiba calculators' Within an hour and a half, I can usually get my entire order shipped" The accommodating sibling store ships by one of the express services and delivery to the customer is in 24 to 36 hours.

Merker has even used the DBRS electronic mail to beat out one of Xerox's field representatives who called on a potential customer at his office after the prospect had shopped in the store. The field rep promised delivery of a copier and computer in

(continued on page 166)

DATA-BASE DIVERSIONS

All is not strictly business on data base retrieval systems (DBRS). Among the data bases offered by The Source and CompuServe are software programs that can be downloaded to personal computers so technophiles can experiment at their leisure. And there are, of course, games.

Some subscribers use the electronic mail facility to vent their political passions. Mike Sidoric, of Informedia, likes to keep tabs on the troubles plaguing the social security system. "As a sole proprietor," he says, "I'm afraid that the social security system's demise is going to increase our tax burden considerably. They're going to look to anybody who's making money to help bail it out." So he scans the DBRS wire services for social security news, especially in Congress. "I can find out what's going on in the hearings and who's saying what, and use electronic mail to send him a tacky mailgram."

If he used CompuServe, Sidoric wouldn't have to write his own letters. He could call on the services of Lobby Letters of America which, upon receipt of the bare-bones facts and an indication of your mood, will compose and dispatch an appropriate letter.

Also on CompuServe are special interest groups, among them a CB group whose members emulate CBers on their computers, software and hardware users groups, the National Satirists, a work-at-home group for the self-employed, and World Wide Exchanges, for people who like to travel and enjoy exchanging facilities. Other special interest groups abound on both The Source and CompuServe, and it's easy to form new ones via the "bulletin board" facility that both services provide. Computer pen pals are accessible through the bulletin boards, as are advertising opportunities and requests for anything.

CALL "THE COMPUTER-LINE" In Colorado.

"Committed to bringing computers within the reach of all Americans"

The Computer-Line believes that it is important to be competitive by offering low prices; however, we regard service as the most important aspect of a mail-order organization. All our lines are available so that you, the customer, are able to talk to fully qualified computer specialists trained to answer all your questions pertaining to our line of micro-computers. We are renowned for our excellent after-sales support and our promptness for delivery. Peace of mind and excellence in service is our pledge to all our customers.

PRODUCTS for the IBM PERSONAL COMPUTER

The Ultimate IBM® Peripheral MONTE CARLO™ CARD

Five Functions — Memory/Serial/Parallel/Clock/Joystick

- Up to 1 Megabyte Expandable Memory
- One IBM Compatible Centronics Parallel Port
- One IBM Compatible Asynchronous Communication Port
- Clock/Calendar (Battery-backed) with Alarm
- Dual Port Joystick Interface
- Future Upgrade Options: Direct Connect Modem

..... \$CALL

And The Sensational

I-C — MAGIC

Prom Chip

Programmable Graphics Screen Dump.

Print Spooling up to 64K

Terminal Emulation..... \$CALL

★ TANDON ★
★ Thin-Line ★
★ TM-55 ★
★ \$245.00 ★

★ TANDON ★
★ DRIVE ★
★ Special ★
★ Double Side/ ★
★ Double Density ★
★ 320K Bytes ★
★ of Storage. ★
★ TM-100-2 ★
★ \$249.00 ★

★ Special ★
★ PRINCETON ★
★ GRAPHICS ★
★ SYSTEMS ★
★ 690 Dots Hor. ★
★ 16 Colors ★
★ Non-Glare Screen ★
★ Color at its finest ★
★ \$CALL ★

★ RAM ★
★ SPECIAL ★
★ 4164 Dynamic Ram ★
★ 200NS. \$5.00 ea. ★
★ U.S. made by Texas ★
★ Instruments. We can ★
★ supply the quantity & ★
★ price Dealers & Manf. ★
★ need. Call or write for ★
★ volume pricing. ★

QUADRAM CORPORATION

Quadboard: The memory board for the IBM featuring:

- Fully Expandable from 64K - 256K
- Parallel Port
- Asynchronous (RS232) Serial Port
- Clock/Calendar
- RAM Disk Drive

..... \$CALL

Microfazer:

- Buffering from 8K - 64K (4 - 32 pages of text)
- Printer & Computer Independent
- Parallel/Parallel; Parallel/Serial; Serial/Serial available
- Compute while you print!..... \$CALL

SOFTWARE

Ashton-Tate:

D. Base II..... \$475.00

Continental:

Home Accountant Plus..... \$99.00

The Business Manager™

A complete accounting/word processing/spread sheet/hard disk system for you IBM PC..... \$CALL

Sorcim Software:

Supercalc..... \$199.00

Superwriter..... \$299.00

Spellguard..... \$149.00

Lifetree Systems:

Volkswriter..... \$149.00

Visicorp:

256K Visicalc..... \$185.00

Visidex..... \$185.00

! Call for the Best Prices on the IBM Personal Computer!

PRODUCTS for the APPLE COMPUTER

We are smashing the prices on Apple Compatible Disk Drives!

FOURTH DIMENSION Drives

Plus a box of Kangaroo Diskettes..... \$289.00

FOURTH DIMENSION Drive with Controller

Plus a box of Kangaroo Diskettes..... \$379.00

CALL FOR PRICES ON RANA ELITE 1/ELITE 2/ELITE 3

DAVONG HARD DISKS: 5 Megabyte \$1475 10 Megabyte \$1875 15 Megabyte \$2275

THIN-LINE APPLE COMPATIBLE DRIVES..... \$CALL

MBI VIP CARD

Dual Port Parallel/Serial Graphics Card..... \$129.00

Use ASCII Express The Professional 4.0 to simultaneously transfer data from modem to printer using the VIP Card.

ASCII EXPRESS (The Professional)..... \$99.00

MBI APPTIME CARD

Works with DB Master and Visidex Mountain Computer mode.

Basic and pascal operation complete with datebook software..... \$ 89.00

RAM CARDS

Microsoft 16K..... \$79.00

CP/M FOR APPLE

Microsoft 280 Card..... \$269.00

Advanced Logic..... \$CALL

Kensington System Saver

..... \$69.00

T & G:

Joysticks..... \$44.00

Select A Port..... \$44.00

Game Paddles..... \$29.00

Kraft:

Joysticks..... \$49.00

Game Paddles..... \$33.00

80 Column Cards

Videx with Softswitch..... \$279.00

WORD PROCESSING SPECIALS

On Line Screenwriter \$85 Pro \$149

Silicon Valley Word Handler \$119

APPLE SOFTWARE

Continental:

The Home Accountant..... \$ 54.00

Silicon Valley Systems:

Word Handler..... \$119.00

List Handler..... \$ 59.00

Stoneware:

DB Master..... \$159.00

DB Utility 1, 2, 3..... \$69.00 ea.

Visicorp:

Visicalc 3.3..... \$185.00

Visifiles..... \$185.00

Visidex..... \$185.00

Visitrend/Plot..... \$229.00

Denver Software:

Financial Partner..... \$149.00

Pascal Tutor..... \$ 89.00

Pascal Programmer..... \$199.00

CALL FOR

ATARI COMPUTER
PRICES.

Call For Prices On Apple I/IIe Basis 108 Computers and
Franklin Ace 1000 / 1200 Computers.

For 24-Hour/7 Days a Week Ordering & Product Information, Call "Info-Line™", our computer modem line, 1-303-279-4218

Operates at 300 Baud, Full Duplex

Monitors

Amdek	Color I.....	\$299.00
	Color II.....	\$699.00
	300G Green.....	\$154.00
	300A Amber.....	\$159.00
	310G Green.....	\$179.00
BMC	310A Amber.....	\$179.00
	15MHZ Green.....	\$ 85.00
	20MHZ Green.....	\$149.00
NEC	1201 Green.....	\$159.00
	1212 Color Composite.....	\$299.00
	1203 RGB Hi-Res Color.....	\$679.00
Zenith	ZVM-121 15MHZ.....	\$109.00
Taxan	Amber.....	\$145.00

COMPUTER-LINE Is Now Open 7 Days a Week!!

Product Information & Ordering Lines

Mon. - Fri., 7 a.m. to 8 p.m.; Sat. & Sun., 8 a.m. to 6 p.m.
(Mountain Standard Time)

Write or call for our comprehensive catalog.



Call
"THE
COMPUTER-LINE"

Product Information & Order Lines: (303) 279-2848 or (800) 525-7877

Customer Service & Order Inquiry Line: (303) 278-8321

ORDER DEPARTMENT: COMPUTER-LINE, Inc. • 1019 8th Street • Golden, CO 80401

COMPUTER-LINE of Denver • 1136 So. Colorado Blvd. • Denver, CO 80222

We have leasing
terms available on
all our equipment.

Look for our "Computer-Line" Stores
opening throughout the United States.
Write for our Franchise Package.

DISKETTES

**Kangaroo: The disks with the 'jump' on the competition.
Outstanding value with library case and a
ten year warranty.

5 1/4" SS/DD (Box of 10)..... \$19.95

5 1/4" DS/DD (Box of 10)..... \$28.95

Verbatim Diskettes

5 1/4" SS/DD (Box of 10)..... \$23.95

5 1/4" DS/DD (Box of 10)..... \$43.95

Elephant Diskettes

5 1/4" SS/DD (Box of 10)..... \$22.95

5 1/4" DS/DD (Box of 10)..... \$29.95

MODEMS

D.C. Hayes: Micromodem II (Apple)

w/ Terminal Program..... \$289.00

Micromodem II (Apple)

w/o Terminal Program..... \$259.00

Smartmodem 300 Baud..... \$209.00

Smartmodem 1200 Baud..... \$525.00

Novation:

J-Cat RS232 Direct Connect..... \$119.00

Cat..... \$149.00

Smart Cat 1200 Baud..... \$455.00

Applecat II (Apple)..... \$289.00

PRINTERS

TEC/C-ITOH Printers

Prowriter I Parallel..... \$379.00

Prowriter I Parallel/Serial..... \$499.00

Prowriter II Parallel..... \$649.00

Prowriter II Parallel/Serial..... \$699.00

F10 Starwriter Letter Quality 40 CPS Printer,

Diablo Standard Daisywheel..... \$1195.00

F10 Printmaster 55 CPS..... \$CALL

OKIDATA

Microline 92: 160 CPS bidirectional with 40 CPS

correspondence. 80 column..... \$575.00

Microline 93: 160 CPS bidirectional with 40 CPS

correspondence. 132 column..... \$995.00

Pacemaker 2350: 350 CPS bidirectional/2 color printing.

136 Column..... \$2195.00

Parallel..... \$2295.00

Serial..... \$2295.00

Pacemaker 2410: 350 CPS bidirectional/2 color printing.

85 CPS correspondence..... \$2495.00

Parallel..... \$2495.00

Serial..... \$2595.00

Call For Prices On All OKIDATA Printers!!

Star Micronics

Gemini 10 & 15..... Price is Too Low To Publish

IDS Prism

132 Color..... \$1495.00

Smith Corona

TP-I Parallel or Serial..... \$569.00

Call for Prices on Epson's New FX Series!!

TERMS: All prices reflect a 2% cash discount. All goods acknowledged faulty on receipt by the customer will be repaired or replaced at our discretion. Customers must call for a RMA number before returning any goods. This facilitates our quick attendance to faulty goods. We reserve the right to repair or return to the manufacturer for repair all goods becoming faulty within the specified warranty period. Any goods (hardware or software) returned for replacement are subject to a 15% restocking fee at our discretion. The charge for cancellation of orders is 25% at our discretion. No returns on software. We accept no responsibility for any false claims made by manufacturers. Prices quoted for stock on hand and subject to change without notice. Specialists in APO and international deliveries. Please add 2% (minimum \$3.00) for shipping APO and add to all prices 5% for shipping (minimum \$5.00). Please allow 10 working days plus mail time (if an order is mailed) in for receipt of all UPS delivered goods. All goods (other than APO or international) delivered UPS ground.

ALL BRANDS ARE REGISTERED TRADEMARKS

JUST THINK...DEALER DEMO SOFTWARE FOR ONLY \$295

We think you think the same way we think... that the best way to sell hardware is by demonstrating what it will do. That's why we've put so much emphasis on developing the best software demonstration system in the industry. Literally thousands of computers worldwide are now being sold as the result of our demonstration software. We make it as easy and inexpensive as possible for you to get our demonstration system because we know from years of experience that after you see our dealer demo package you'll buy our software... and so will your clients and customers. That's why we send you our entire Financial Software Series demo for only \$295, or you can get all the business applications listed here for just \$595. And both packages include valuable promotional materials designed to help you close the sale. We are one of the largest software manufacturers in the industry because we give you the very best quality, selection and support available anywhere... plus a demo system that, more than anything else, is designed to help you sell your hardware. We did it that way because we think we know how you think. For complete details, just give us a call, or send a card.



FINANCIAL General Ledger • Accounts Payable • Accounts Receivable • Payroll • Cash Receipts/Disbursements • Job Costing • Inventory Control • Order Entry/Invoicing **MEDICAL/DENTAL** Office Scheduler • Patient Billing • Accounts Receivable • Insurance Forms **SCHOOL MANAGEMENT** Student Record Keeping • Student Scheduling • Fund Accounting **CHURCH MANAGEMENT** • Pledges and Contributions • Membership Rosters • Talent Index • Fund Accounting • Office Scheduler **WHOLESALE DISTRIBUTION** Purchasing and Receiving • Inventory Control • Invoicing and Receivables • Sales Commission • Reporting Backorder Management **MANUFACTURING INVENTORY CONTROL** Finished Goods Inventory Management • Parts Inventory Management • Parts Purchasing and Receiving • Bill of Material • Production Scheduling



**INTERNATIONAL
MICRO SYSTEMS**

6445 Metcalf • Shawnee Mission, KS 66202
(913) 677-1137

All IMS business applications require 8 or 16 bit versions of CP/M® or MP/M® and CBASIC® coming soon CB80® and CB86®...registered trademarks of Digital Research Corp.

How Dow Jones News/Retrieval Makes Learning Fun For The Oertells

The Oertell's have discovered there's something enjoyable for every member of the family in Dow Jones News/Retrieval®. This unique computerized information service is changing the way this family learns, shops and gathers information.

"The Whole Family Enjoys It"

"I started the News/Retrieval service primarily for my personal investment decision-making," explains Harold Oertell. "But since the service was installed, the whole family is enjoying it in ways I never imagined."

There are 20 data bases in all, including sports, weather, general news, a shop-at-home service and movie reviews. Even a complete 20-volume encyclopedia, plus business and financial information.

"News/Retrieval puts an incredible amount of information at our fingertips," says Harold's wife, Elinor. "It's really broadening all our minds and is especially good for the kids. When you have something that's both fun and educational, you have something very special."

"It Makes Learning Fun"

The fun part is accessing the information. There's a natural love affair between kids and computers. Seventh-grader Ronald and his 15-year-old sister, Ingrid, are proof of this. "It really makes learning fun," Ronald explains. "I've already used the electronic encyclopedia more in just a few weeks than I have our printed encyclopedia in my whole life."

Both Ronald and Ingrid have found the easy-to-use encyclopedia and the various news-oriented data bases invaluable for a variety of school projects, from special reports to biographical data.

But the sports data base for Ronald and the movie reviews for Ingrid are the real passion. "Some times I'll go into the encyclopedia," confesses Ronald, "just for an excuse to go into sports later. They've got everything."

For Elinor, the News/Retrieval shop-at-home service "makes it easy to comparative shop. But I'm most excited

about the way the kids are learning to become computer literate, which will be so important later on in their lives."

"It's Paid For Itself For Life"

As for Harold, his initial enthusiasm for News/Retrieval hasn't changed a bit. "As far as my investments are concerned, it's already paid for itself for life. I have more control over my investment decisions than ever before."

But there is one problem. As Ronald puts it, "Sometimes I think we need more than one computer."

Call For Free Booklet

For learning that's fun, all you need is a personal computer, a telephone and a modem. Ask for a demonstration at a computer store or call for a free 12-page booklet.

Call Toll Free

1-800-345-8500, Ext. 5

(Canada, Alaska & Foreign call 1-215-789-7008, Ext. 5)



Dow Jones News/Retrieval is a registered trademark of Dow Jones & Company, Inc.



Taking A Stand For Computers In Education

How one teacher turned computer learning into a class act

by Tony Howarth

At a time when many of the nation's educators are foggy and perplexed about where the personal computer fits into the educational scheme of things, one teacher at Blind Brook High School in Rye

Tony Howarth is a free-lance writer interested in computer applications in education.

Brook, N.Y. is remarkably clear-eyed about it. David Press, the 36-year-old computer-instruction coordinator for his school district, feels the greatest attribute of the personal computer is its ability to foster self-esteem and independence. He is using personal computers to teach kids to run their own lives.

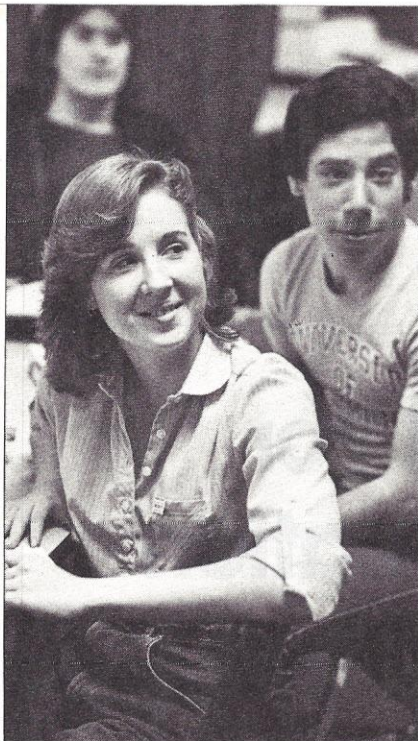
Initially a member of the school's

math department, Press now devotes himself to teaching computer science. "The most important job of any educator," Press says, "is to help kids see themselves, help them understand who they are, and help them realize their own potential."

In Press's 10th grade program, he teaches the fundamentals of computer science.



photos by Andy Levin/Black Star



It's not the kind of comment you would expect from one whose specialty is numbers, theorems, and cut-and-dried right-or-wrong answers. But Press does not approach his job in such a traditional way. "I hate the idea of producing lockstep kids wearing blinders who are ready to take on the mechanized world in a mechanized way," he says. "I'd much rather have a kid study computers, do well at it, and do well with other things—be together as a person."

And Press feels that it's all in the way it's taught. "Think of it this way," he says, "if you pick up an American kid and put him down in France—in French-land, if you will—the kid will learn to speak French and to survive in the French way of things. So what I try to do is to create a Math-land, a place where the kid will learn to speak Math and to survive in the Math way of things."

The personal computer has allowed Press to show his students how they can manipulate shapes, sizes, motion, color, and space in their graphics displays. He feels that by doing this they realize they can know more and understand infinitely more concepts than they did before. In addition, students discover that they can think through an action at the keyboard, rethink it, and rethink it yet again.

"If a youngster sits down in a com-
The computer has helped Press show his students how to manipulate graphics. He feels that this gives high schoolers a better understanding of the concepts involved.

EDUCATION

puter environment which has become natural to him—Math-land—and types out 'FD 30 RT 90' four times, the graphic will form a square," says Press. "The kid has now taught the machine to square. Think about that for a minute—this seven-year-old has created a square, which is just as powerful as the programmer's word, FD.

"For that youngster, it's like inventing a word and having it wind up in Webster's," he says. "What power it gives the kid—what control over the world he lives in. I sure never had that kind of thing happen to me when I was his age."

Start at the very beginning

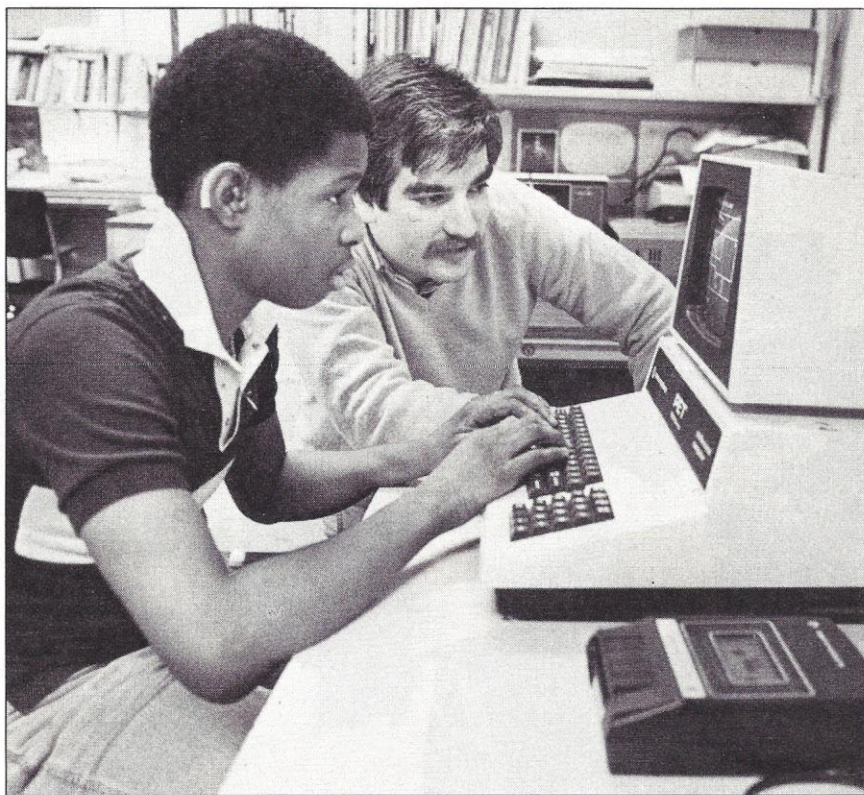
To gain this familiarity with computer technology, Press believes kids have to start young. This means introducing the curriculum in the lower grades—even as early as first grade.

Press feels kids should get a basic introduction to computing in the first

and second grades. This instruction should come from the classroom teacher. The children should learn to type at the keyboard, to communicate with the computer, and to realize that the computer can respond to them.

Press thinks the interaction between teacher, child, and computer can be used to teach educational concepts in an interesting way. A good example, he says, might be an arithmetic game in which the child must first draw a fishhook on the screen before he can solve the problem. Then he would have to manipulate the hook on the screen to select the answer to the problem from a list of possibilities.

In grades 3 through 6, Press would like two curriculum streams to be at work. In one stream, classroom teachers would introduce the children to Logo, a computer language developed by Seymour Papert and which, through the use of "turtle"

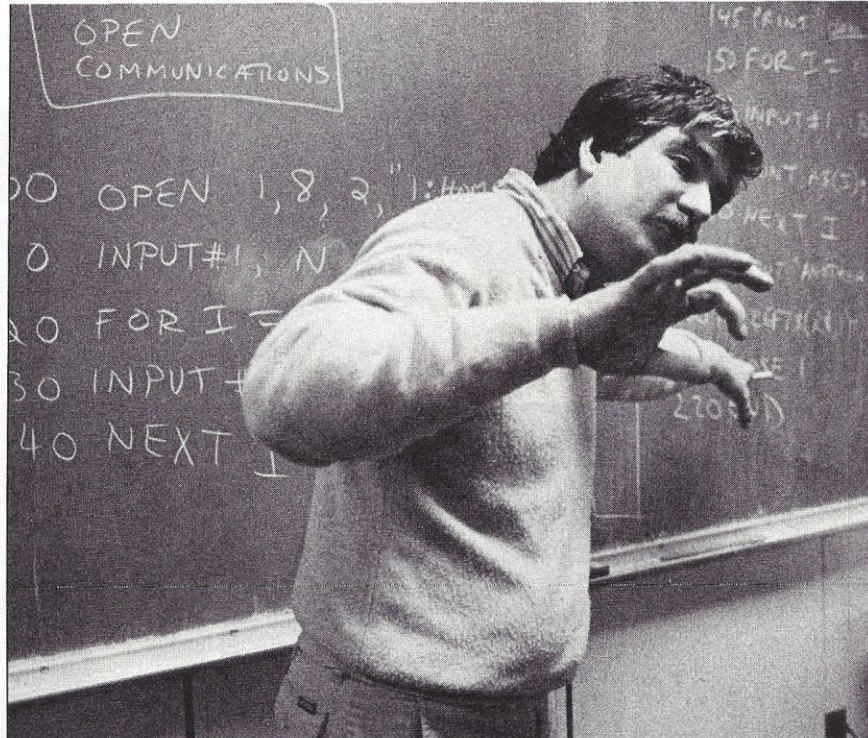


Computer instruction is coming into the classroom.

graphics, allows children to build intellectual structures through estimation, interaction, experience, and revision.

Press cites Logo as a prime example of how students can be taught to control the computer. The language was designed to foster just this sense of control and to give children a chance to play with concepts so sophisticated that many high-school students have not studied them. "It makes sense, doesn't it," he asks, "to think of velocity as so-and-so many turtle-steps per second?"

The second stream in grades 3 through 6 would concentrate on computer-assisted instruction (CAI) work. There is a place for CAI, Press says, but it should not be considered, in and of itself, a "curriculum." He'd like to see a lot of individualized instruction in grades 3 through 6, pulling kids out of class for help, if need be. When a student can't multiply—can't carry when multiplying with

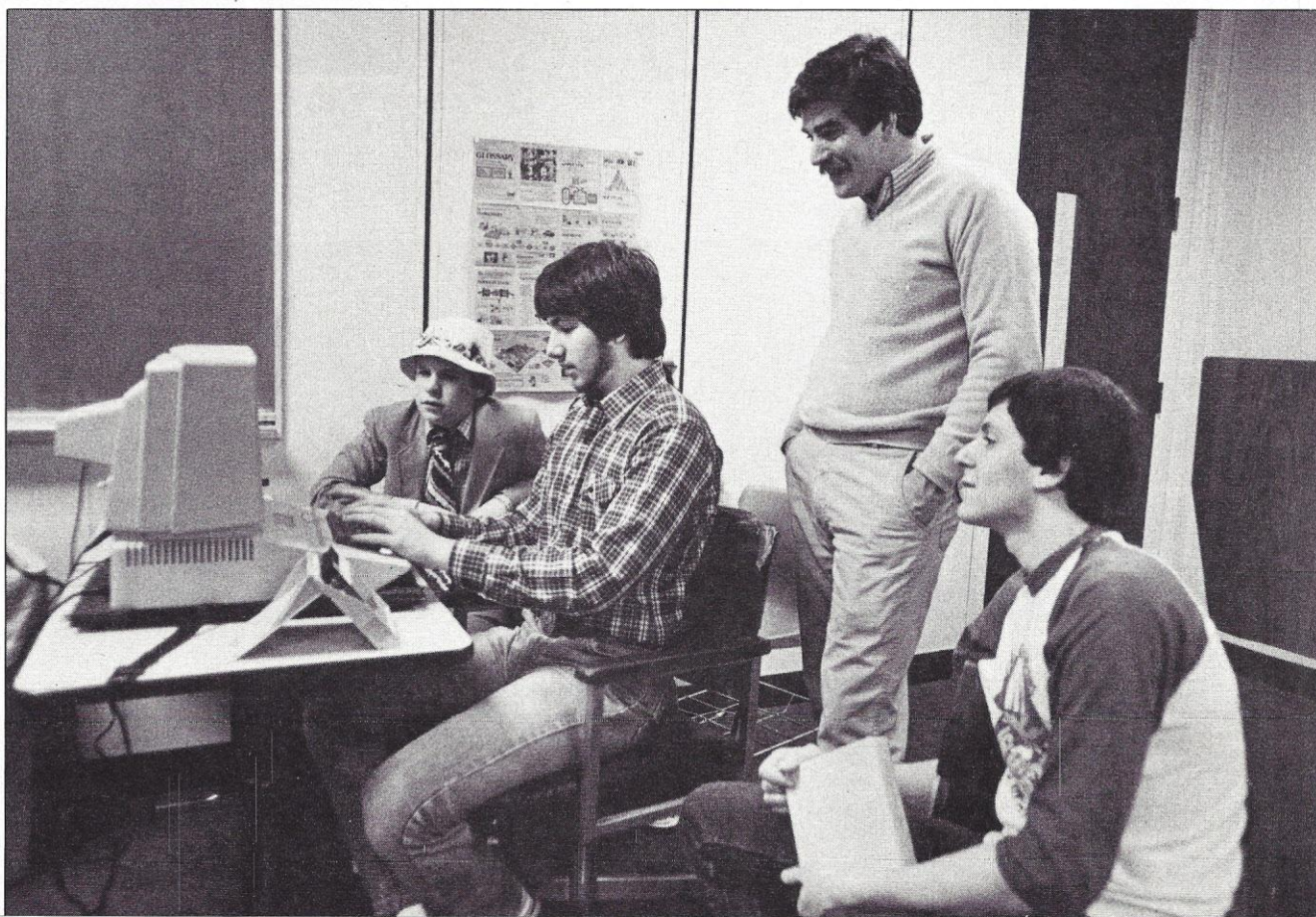


two-digit numbers—it could be useful for him to work with a program that gives him practice multiplying and points out what the concept of carrying is.

Bringing personal computers into the elementary school classroom presents one problem—training the classroom teachers. But one point to remember is that computers do not replace the classroom teachers in any way. "What has begun to happen," says Press, "is that computer in-

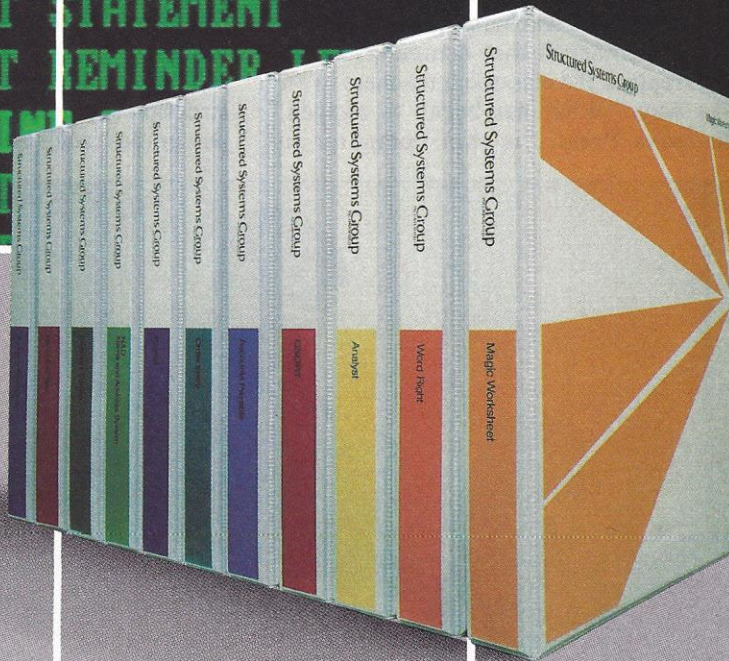
struction is coming into the elementary classroom the same way music is brought in—on an occasional basis by a specialist. It's the wrong approach. There are lots of folks who wish we could go back to the days when the elementary teacher had her own piano and would pound out a few songs in between the spelling lessons."

The specialist in computer instruction should take over in the upper grades, such as grades 7 and 8,





Magic Worksheet
 Word Right
 Analyst
 Q SORT
 Accounts Payable
 Order Entry
 Payroll
 Nad
 Name and Address System
 Inventory Control
 General Ledger
 Accounts Receivable



Series 2.0. The most
 comprehensive, advanced
 line of business software
 for CP/M computers.
 Designed to be used.
 Engineered for results.

Structured Systems Business Software.

CP/M is a registered trademark of Digital Research, Inc.

Structured Systems Group, Inc. 5204 Claremont Ave. Oakland, CA, 94618 (415) 547-1567

CIRCLE 50

Kids should understand that BASIC is only one of several computer languages.

EDUCATION

where the kids should be introduced to BASIC. This program is now being offered at Blind Brook as a 10-week elective course. "I like to teach BASIC in such a way that the students learn how to apply it to problems in business, math, social studies, and science," Press says.

"There's a tradition of computer teachers coming from a math background and seeing the computer only as a means of teaching math. That's too narrow," he says. "The kids should understand, at this point, that BASIC is only one of several languages which can be used to communicate with the machine and that in certain situations other options may work better."

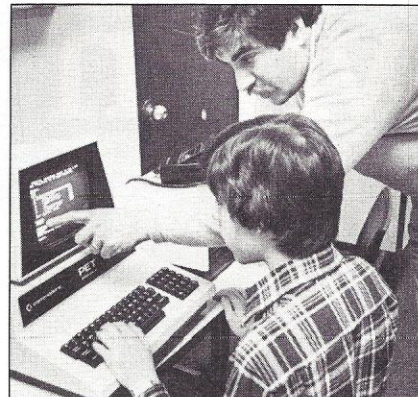
One computer language Press would not teach is COBOL. In his opinion, "It sends kids to a narrow place, to a certain dead-end place in

the business world, rather than opening them up to all the promise of this machine and the world it works for." He admits there are times when everyone has to face one of these narrow places when we focus on what kind of work we want to do in life. But he feels this kind of decision doesn't really belong in a secondary school.

Up to the senior circuit

This fall, Press will institute a required survey course for all students in the ninth grade. The course will introduce kids to personal-computing applications that can help them in their other high-school courses.

As computer use at the secondary level expands—social studies teachers using the machine for survey questionnaires, math teachers graphing multiple trigonometry functions, physics teachers diagramming resultant vectors of force—concepts will be easier to understand and teach

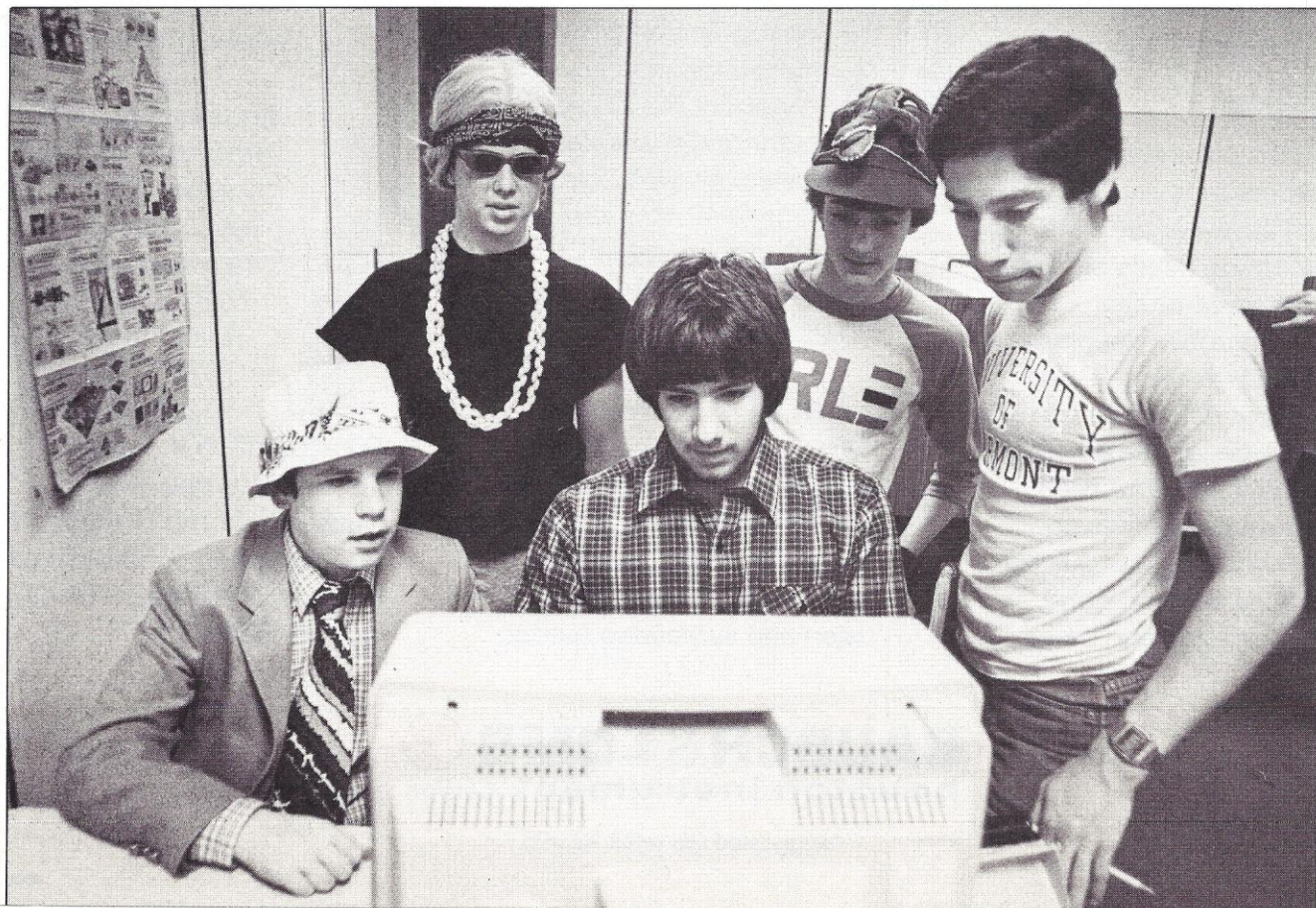


if the students are given an overview of the computer's functions.

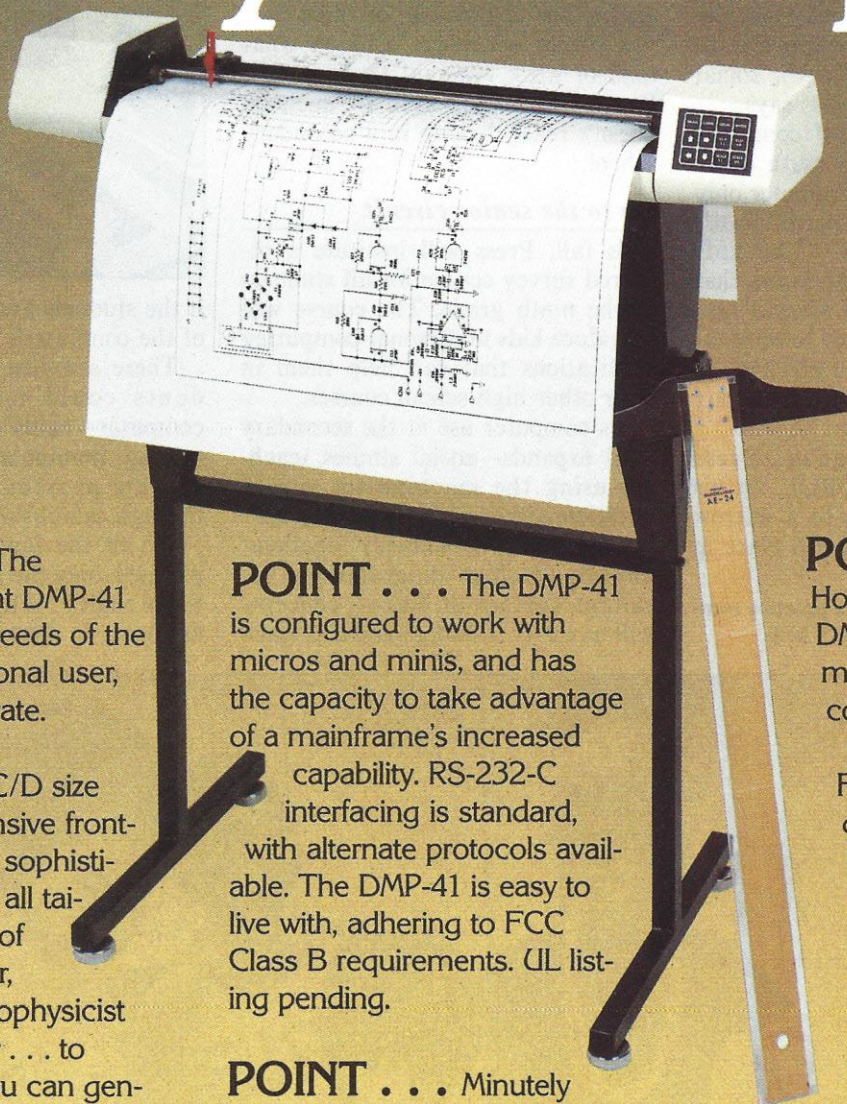
There are also specific skills students could master using the computer—skills such as word processing, manipulating data in a research project, and searching through established data bases.

Of all the innovations Press has planned, only the program for grades 10 through 12 is firmly in place at the moment. In these grades, Press be-

Dressed for a play, students practice computing concepts with Press's help.



It's easy to make points when you're a pro.



POINT . . . The Houston Instrument DMP-41 plotter meets the needs of the serious or professional user, yet it's easy to operate.

POINT . . . C/D size format, comprehensive front-panel controls and sophisticated firmware are all tailored to the needs of the surveyor, drafter, oceanographer, geophysicist and land developer . . . to name but a few. You can generate superior architectural elevations, contour maps, circuit-board layouts and assembly drawings quickly and accurately on bond, vellum or synthetic media.

POINT . . . The DMP-41 is configured to work with micros and minis, and has the capacity to take advantage of a mainframe's increased capability. RS-232-C interfacing is standard, with alternate protocols available. The DMP-41 is easy to live with, adhering to FCC Class B requirements. UL listing pending.

POINT . . . Minutely defined step size and high-resolution logic—combined with robust drives and optimized pen ballistics enable you to create plots of high precision and surpassing quality.

POINT . . . The Houston Instrument DMP-41 is one of your most cost effective considerations.*

For the name, address and phone number of your nearest distributor, write Houston Instrument, 8500 Cameron Road, Austin, Texas 78753. Phone 512-835-0900, or

800-531-5205 if outside Texas. In Europe contact Bausch & Lomb Belgium NV, Rochesterlaan 6, 8240 Gistel, Belgium. Tel 059-27-74-45, tlx 846-81339.

BAUSCH & LOMB 
houston instrument division

CIRCLE 105

*suggested US retail \$2,995

lieves the students should really get involved in computer science. And some kids have become involved.

One student has a part-time job with a local firm translating programs for one particular computer to two other machines. The editors of the school newspaper are producing the paper with word-processing software. And two other students have devised an inexpensive way to control a toy car by hooking up the remote control transmitter to a computer.

"The kids took their soldering guns down to the basement and played around like crazy," Press says. Now they're talking about marketing it and hooking up a light sensor to the car so that the computer can control its turns. "Maybe they'll build a robot vacuum cleaner before long!

"There are certain kids who have 4.0 averages in school and will do well within any context," he says. "But there are other kids who question everything—you know, the kind who are labeled troublemakers because they won't settle down and accept the word that's coming at them from the front of the room. They're the best kind."

Press loves to take the initial interest he finds in some of his "arcade zombies" and turn it around. They learn that when they play arcade games, the computer limits—and thus controls—their choices. It doesn't have to be that way. Press shows them that the computer can be a tool they control.

The kids feel it too

Interest in computing is one thing, but at Blind Brook interest has become almost an obsession. Recently Press acquired Spritelogo. Three hours after the students saw it in action for the first time, with darkness settling in on the parking lot outside, eight students were still clustered around the giant display screen. They heckled the operator, homework in front of them, absorbed by the changing configurations on the screen.



There is a place for computer-assisted instruction in the schools, Press feels, but it should not be considered, in and of itself, a "curriculum."

"What I'm doing at Blind Brook is good," Press says. "But I won't take the credit for what's happened. I give credit to the machinery; it's made all the difference."

When Press began at Blind Brook, there was just one man, Tom Reistetter, teaching a single-semester computer course. The only computer in the school was an old Hewlett-Packard 2000-F linked by a typical time-sharing plan to a mainframe run by the regional board of cooperative educational services.

Reistetter was typical of thousands of computer teachers in one way—he was on the staff when the administration decided to install a computer course, so he was given a machine and told to teach the kids what it was all about. But he was unusual in another way—he felt a tug at his conscience at being asked to teach a course in which the students knew more than he did.

Reistetter asked to be relieved of the assignment and the school went looking for a computer specialist. That's when they found Press, who has a computer science degree from the University of Wisconsin. The school's principal at the time, David Schein, told Press he would be teaching some traditional math at first and "Let's see what happens."

What happened was that the kids at Blind Brook loved what Press had to offer. Enrollment in his classes in-

creased steadily, forcing his program to expand to the point where now Press teaches four classes a day—all 10th, 11th, and 12th grade students. In September, he was appointed computer coordinator for his entire district.

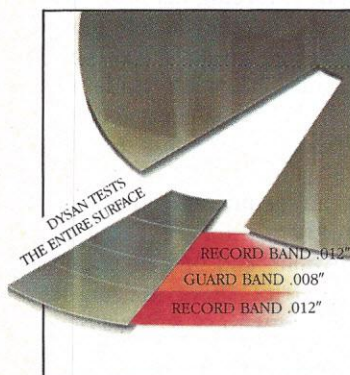
Press started acquiring equipment for his program—six PETS, one Atari, one Apple, and one Imsai. In the entire district there are eight PETS in the elementary schools and four IBM Personal Computers that the schools are using with the John Henry Martin "Write-To-Read" project.

Press came by the equipment in fairly traditional ways—half the machines were donated by the Parent Teacher Association. "Listening to so many other teachers in this part of the world, this is typical," Press says. "Only after the PTA has put the machines in the school do school boards begin to pick up on the momentum."

This is exactly what happened at Blind Brook. Once the PTA had paved the way, the remainder of his machines were acquired through normal funding processes with a minimum of difficulty.

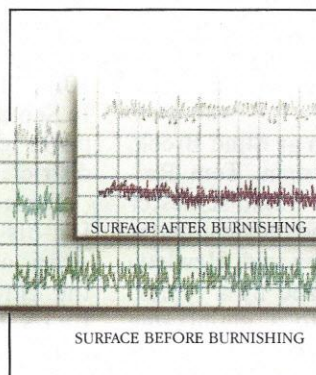
In 1977 Press decided to order an Apple, but in the time lapse between his decision and the actual purchase of the machine Commodore made an offer on its PET personal computer that he couldn't refuse—"Buy two, get one free."

Four Reasons Why The Dysan Difference is Worth Paying For



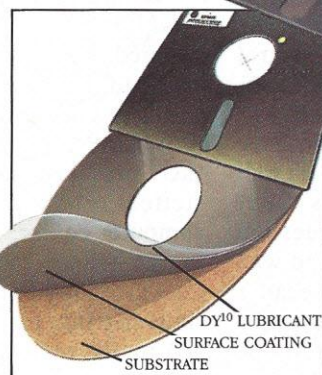
1. 100% Surface Tested

Only Dysan provides fully usable diskette surfaces that are truly 100% error-free across the entire face of the diskette. An exclusive on-and-between the track testing procedure guarantees error-free performance regardless of temperature and humidity distortions or slight head misalignments.



2. Advanced Burnishing Techniques

Dysan's advanced polishing methods create a smoother, more uniform diskette surface. This results in better signal quality on each track, less wear on drive heads and reliable access to data after millions of head passes.



3. DY¹⁰™ Lubricant

Dysan's proprietary DY¹⁰ lubricant complements the advanced burnishing process. Both maximize error-free performance while minimizing headwear. Optimal signal presence is maintained between the head and diskette surface during millions of write/read interfaces.

DY¹⁰ is a trademark of Dysan Corporation



4. Auto-Load Certification

Dysan's unique quality control methods reflect technological leadership in designing, producing and testing precision magnetic media. Each diskette is unerringly certified by Dysan-built, automated and microprocessor controlled certifiers. Your system and data base will benefit from Dysan's diskette reliability and unsurpassed quality.

Select from a complete line of premium 8" and 5 1/4" diskettes, in single or double densities, certified on one or both sides.

CIRCLE 55

dysan **Dysan**
CORPORATION

Corporate Headquarters:
5201 Patrick Henry Drive
Santa Clara, CA 95050
(800) 551-9000

"I plan to make sure the computer will serve no one god. It has to serve everyone and everything."

So Press wound up with three personal computers and the 2000-F terminal. With the acquisition of these computers, the program really began to take off. "If I had 16 kids using those four machines, I was able to give eight of them a lesson in one class period while the other eight were at the keyboard."

Making future plans

Now that the program is in working order, the next item on the school district's agenda is to lay out computer-education goals for the future and see what can be done to achieve them. Press has been meeting regularly with a computer advisory committee of 25 people—parents, staff, and students.

"I have my own vision," he says, "which shouldn't fall too far away from the vision of the whole group." The school administration, like most administrations, wants every child to be computer literate. But they don't really know what the term means. They do know that public pressure for computer literacy is mounting. "We're talking," Press says. "We're trying to formulate some coherent goals and trying to see just how they can be implemented."

"Whatever happens, though, I plan to make sure the computer will serve no one god," he says. "It has to serve everyone and everything—creativity, math, science, the humanities, self-esteem, the classroom teacher—all the different curriculum and personality options that make up a vigorous community like ours."

The extent of the urgency

Press senses this computing urgency on two levels. On the one hand, he feels it's of the utmost importance that we get a handle on what's done in the schools, making sure it is being done constructively and in a way which is encouraging to kids. That means, among other things, that the computer should not be used just to deliver instruction.

Second, he says, the outside world has completely adopted the computer—it's in business, in cars, in stores, in our telephones—so we have to adopt it in the schools too. We have to make haste to ensure that our youngsters are ready to use this tool in meaningful and productive ways.

Press's thinking stems in part from his background in teaching at alternative schools—one in Trenton, N.J., and another in Queens, N.Y. He enjoyed the experience and says it "woke him up. The schools were more of a family than a school."

But the schools were not well-equipped. They were run on a shoestring and Press had to accept the lack of equipment as part of the price of making what he thought was a real contribution to some troubled lives. "I think that if we had had all the things at that time that the personal computer provides us with now, we could have turned those kids right around."

The alternative schools were populated by students who had broken out, or had been thrown out of "main-line schools," because they were unable to deal with the demands of the schools and of society.

"Papert's dichotomy of educational philosophies works in these schools," he says, "because main-line schools tend to emphasize stuffing them with facts—SATs and all that—something these kids resist. What they really need is to be stuffed with skills." Give kids more skills, Press believes, give them more control, a greater feeling of power over a certain piece of the world and you give them greater mastery in other parts of their lives.

It's not something that can be tested. It's the hidden benefit that can't ever be recorded in a teacher's lesson-plan book. But when students master the machine, they are really learning the exciting dimensions of their own potential, their own power to grow and to discover and to control the world around them.

For kids who have been hemmed in—and so many of them have—by schools, by the street, by other kids, by adults—this sense of control is pure dynamite. "Let's face it," says Press, "teaching computers should be listed as one of the humanities."


"What's fascinating," he says, "is that the people who ran those free schools were anti-technology to the core—convinced somehow that machines had a stranglehold on human development." But now, he believes, those same people are carrying the torch for high-tech, and especially for its deployment in the schools.

According to Press, the personal computer cuts through a lot of the red tape schools are caught in. The computer can be used to develop curriculum materials on its own.

Press feels students who aren't computer literate by the time they leave high school will fall behind in the adult world. "I see my kids going from here to college with a terrific edge over other kids."

But for Press, above all, the computer is a tool which his students must learn to use in human and humane ways. The people who design the equipment must take these factors into account. This goes for the software too—it's got to be geared to helping people use the machine. "People who create software have to understand the population they're trying to serve or there will be mismatches and misgivings."

Press hopes he can do something to help turn the corner on that part of the computer picture. He wants to continue to teach computing as if it were one of the humanities. But that's the point of his teaching, too. Fulfillment is everything. "We must not deify the machine," he says, "nor must computing be taught as an end in itself."

And perhaps, he says, if his students can maintain the humanistic attitudes he wants to foster, they can go out and make the machines work even greater miracles. 

HIGH TECHNOLOGY REQUIRES HIGH PERFORMANCE ACCESSORIES

HICKORY HILL COMPANY
SUMMARY: 20 FEB 1988
STATEMENT OF PROFIT & LOSS

CATEGORY	PLAN	ACTUAL
SALES	40,000	51,000
COST OF GOODS	20,000	20,000
NET SALES	20,000	31,000
ADMINISTRATION	4,000	4,000
ADVERTISING	2,000	4,000
RESEARCH	17,000	19,000
TOTAL COSTS		

In the fast moving, high technology world of microcomputers, the need for high performance accessories often gets overlooked.

Discwasher, recognized as a world leader in audio/video care accessories, understands this need and has developed a line of computer accessories to allow users to get the most from their computer hardware.

The easy-to-use *Discwasher® Disk Drive Cleaner* is both a problem preventer and problem solver. Its dry format safely cleans single or double-sided drives without altering the delicate head alignment or doing possible damage to rubber drive parts with solvents.

The *Discwasher® Computer Cassette Drive CareSet™* is a total maintenance package for your cassette drive system. It includes both the *Discwasher® Computer Cassette Drive Head Cleaner* and the *Computer Cassette Drive Mechanism Cleaner*. Together, these two maintenance units can keep the high resolution heads and the critical drive system of your cassette drive system in optimum performance.

The *Discwasher® DiscKeeper™* is a magnetically shielded storage system for floppy disks that takes up no more space than conventional folder packs. *DiscKeeper* protects against stray magnetic fields which can destroy valuable software. Three *DiscKeeper* sizes provide loss-free storage and protection for transporting any size disk format.



discwasher

1407 NORTH PROVIDENCE ROAD, P.O. BOX 6021, DEPT. PC, COLUMBIA, MO 65205 USA

CIRCLE 56

A DIVISION OF JENSEN an ESMARK Company

Copying Computer Software: What Risks, What Penalties?

A branch of the law specializing in computers and electronic information dates back to the first mainframes. Much of this early computer law was concerned with contracts with vendors for hardware and software. Today those and other concerns are coming into prominence with the advent of personal computers as a consumer purchase. Some of the legal questions raised by the development of personal computers are traditional legal questions recast for the electronic medium; others are wholly new questions raised by the personal computer's unprecedented capabilities.

In this new column on computer law, Personal Computing intends to explore these questions and what they mean to you, the personal computer user. This month the first column explores copyright law, and examines the legal implications of copying or modifying software. The column was prepared in consultation with Daniel T. Brooks of Computer Law Advisers in Springfield, Va. Involved with computer law for two decades, Brooks holds degrees in law and electrical engineering from Stanford University. He is also the secretary of the 10-year-old Computer Law Association, a professional society independent of the American Bar Association.

The author of a software package can protect his rights of ownership in four bodies of law: trade secret, contract, patent, and copyright. In fact, a given software package may actually be protected by more than one set of laws. But commonly, personal computer software is protected under copyright law.

Copyright is federal protection of

intellectual property. According to the 1976 Copyright Act, works written after January 1, 1978, are automatically protected by copyright. Registration of that copyright with the Copyright Office of the Library of Congress is an elective procedure.

Two elements are needed in order to take out a copyright—the author's ideas, and the tangible expression of those ideas. The idea for a plot of a novel is not subject to copyright, but the novel itself—the expression of those ideas—is. Similarly, the idea for a spreadsheet computer program cannot be copyrighted, but a specific computer program written to do the spreadsheet can.

Congress specifically intended the 1976 Copyright Act to cover computer programs as a subcategory of literary works. Compressing the substance of several sections of the Copyright Act into a single statement, copyright law protects 1) original works of authorship 2) fixed in tangible media of expression 3) from which they can be perceived, reproduced or otherwise communicated 4) directly or indirectly, with or without the aid of a machine or device 5) for a period of more than transitory duration.

Under the Copyright Act, the author of the computer program is the owner of the copyright. Generally the author of the program is the person who writes it. The major exception is for employees who wrote the program as part of their job; in that case the employer is considered the author. The copyright owner has five exclusive rights. He is the sole owner of the rights to reproduce his own work in copies, prepare derivative works based on the original, perform the work publicly, display the work pub-

licly, and distribute the work to the public. Those rights are divisible—that is, the owner can split them up and assign them to others as he desires. He can, for example, sell distribution rights for his program to a software manufacturer.

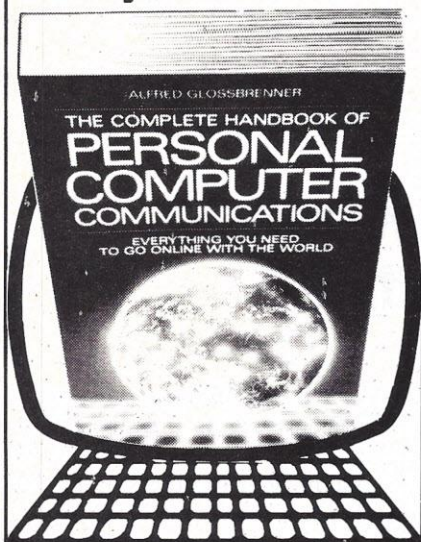
What the user gets

What you get when you put down your money for the package in your local computer store depends on whether you acquired your particular copy of the program through sale or through lease. In the case of personal computer software that distinction may not always be obvious.

If the disk of the program was sold to you so that you own it (as you own the copy of a book you buy), then under Section 117 of the 1976 Copyright Act you have two statutory rights. First, you have the right to make as many copies of the program as you need in order to use it or to store it for backup or archival purposes. You do not have the right to make and distribute extra copies of the original program to someone else any more than you have the right to photocopy *Moby Dick* and hand out copies. Second, you have the right to modify the program to make it appropriate for your use. But you don't have the right to distribute the modified version of the program—even though part of it is your own work.

When you put down your money for the disk at the computer store, thinking that you bought the software package, you may in fact have leased the disk for a one-time fee. How can you tell? If the disk of the program is leased, the license that comes with the disk (sometimes visible through the shrink-wrap) should make that distinction clear. (If it

**Bring thousands of dollars
worth of information home
for only \$14.95!**



"The best reason to buy a computer. Packed with useful information—it's an absolute must for computer owners everywhere."
—Gary G. Reibsamen, Vice-President of NewsNet Inc.

Your passport to the electronic universe—how to turn any personal computer or word processor into a communication/information machine of incredible versatility and power, even without a knowledge of programming. Here's just a sampling of what you get—*** How to select a modem and communications software** * How to send electronic letters, telexes and MailGrams™ *** Money-saving techniques for using The Source, Dow Jones News/Retrieval, DIALOG, BRS and more** * Get free software! Download thousands of programs * **Get privileged information from \$30,000 worth of newsletters** * Get discounts of 10% to 40% by shopping on-line * **Trouble-shooter's guide to problem-free communications** * Hundreds of free computer bulletin boards (CBBS) * **Access vast libraries (Library of Congress, N.Y. Times, magazines, and whole encyclopedias)** * Get real-time computer games and tournaments * **Electronic banking, investment management, and then barter** * Get toll-free numbers, valuable short-cut commands * **Get on-line advice from experienced users of your equipment.**

Plus much more! In just two days you'll see what this unique handbook can do for you—but we'll give you two weeks to decide. Send for your copy now; if you're not satisfied return it in two weeks for a full refund.

*Main Selection of The Small Computer Book Club
Alternate Book-of-the-Month Club/Science
Selection*

Please return this coupon to your bookseller or direct to:

St. Martin's Press
175 Fifth Avenue, New York, N.Y. 10010 Attn: ML

PEC

Please send me _____ copy(ies) of *The Complete Handbook of Personal Computer Communications* (a \$14.95 paperback each. Please add \$1.50 per book for postage and handling. My check or money order is enclosed in the amount of \$_____. I may examine the book for two weeks and, if not 100% satisfied, I can return it for a complete refund.

Name _____

Address _____

City _____

State _____

Zip _____

CIRCLE 57

LAW

doesn't, in most retail situations you probably have a purchase.) The license accompanying a leased copy is a contract which spells out the rights you have. To ensure its enforceability, some manufacturers require that a prospective user sign and return a copy of the license agreement before the company will deliver a fully executable version of the software. Usually the license terms for a leased disk are more restrictive than the ones governing owned copies under copyright law. The basic principle with licenses is that unless the license says you may do something, you may not do it. Unless the license gives you explicit permission, you may not copy the program. You may not modify it in any way. You certainly can't make copies and distribute them. There is a concept of "fair use" in the Copyright Act covering how much use you may make of someone else's literary material for your own purposes, but personal computers are so new that it is not clear how fair use applies to computer software.

Assuming you bought the disk, or that the license agreement permits you to modify the program for your own use, one common question is how much do you have to modify a program before it's yours? The answer is you can't modify it enough to make it yours. If you add new ideas, logic, coherence and design while retaining parts of the original program code, it's not clear what the resultant work is. It's probably two works: your adaptations and the author's original. In that case, if either of you wants to distribute the modified program, you have to get licenses from each other.

When infringements are pursued

The typical home user doesn't really care about all these legal points. He's going to copy or modify a program because he needs to. So is the average computer user in an office. The single biggest threat to the distributors of computer programs is the copying that goes on in the commercial con-

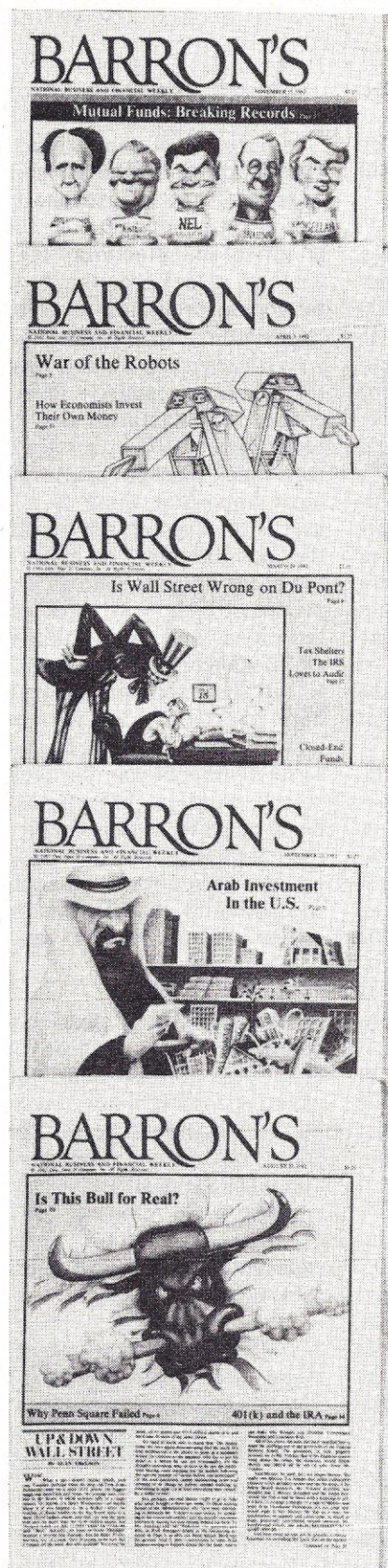
text. About 85 percent of micro-computer sales are to Fortune 500 companies and professionals, making business users the biggest segment of the market. In the office environment the employer is often the purchaser and copies are routinely made for the benefit of fellow employees.

In order to pursue an infringement, the author or manufacturer has to find out that a violation has occurred. That may seem obvious, but discovery isn't always easy. The individual user in the home or office is often immune from prosecution simply because it's impossible for the manufacturer to police every individual personal computer user in the country. There are instances where manufacturers have pursued computer clubs for wholesale copying. Microsoft's reported action against the Home Brew Computer Club on the San Francisco peninsula in 1976 is one example. And there are many stories of manufacturers' representatives making unannounced visits to computer clubs to warn members against copyright violations.

Software manufacturers rarely sue a commercial customer who buys in large volume and whom they'd like to keep. So they don't often pursue a violator if they think a lawsuit will put a damper on future relations. More often they go after the professional pirate who is making and distributing black market software. They also tend to pursue an employee who goes out the door with the tape trailing from his pocket and sets up a competing business, or the bitter rival down the street who tried to steal their secrets. There are cases of customer-competitor lawsuits in which a user licensed a program, made some modifications and thought he had his own program, and then went into business in competition with the original manufacturer.

Finally, it has to be worth it to the prosecuting party to pursue charges. If the cost of a lawsuit threatens to

YOUR INVESTMENT BRIEFING



Subscribe to Barron's and get a weekly briefing designed to keep you ahead of the money game.

In today's turbulent economy there are winners and losers. How do the winners profit from the money game? How do they stay ahead?

Successful investors say the answer is simple. In order to profit in uncertain times they strive to gather all the pertinent, solid information and opinion available — the kind of information that analyzes the economy and shows what's really happening in the financial markets.

They use Barron's, the business and financial weekly from Dow Jones, for their investment briefing. Barron's provides them with regular, in-depth status reports on industries, companies and markets. It's an effective way for investors to keep in touch with the financial world and stay a step or two ahead.

Each week Barron's looks ahead, sending out advance signals of potential problem situations and pitfalls, as well as pointing out financial and investment opportunities in the making. Most publications deal with what has happened. But Barron's focuses on what's likely to happen — in the whole world of business, finance and investments. Every week Barron's is filled with statistics, insights and perspectives — the information you need to make sound investment decisions. All this makes Barron's critical reading — an investment briefing you shouldn't be without.

Subscribe now and get a valuable bonus.

Readers of Personal Computing Magazine who take advantage of this Barron's subscription offer will also receive a unique booklet: "The ABCs of Market Forecasting."

Written by Dr. Martin E. Zweig, one of the nation's most respected experts on market forecasting, the booklet shows how to use Barron's Market Laboratory pages. Zweig points out the market indicators he watches, the statistics he traces and how you can use the Barron's Market Laboratory for your financial benefit.

Let Barron's keep you ahead.

BARRON'S

Attn: Manager of Subscriber Service
200 Burnett Road
Chicopee, MA 01021

☐ Yes, I want to take advantage of this special offer. Please enter my Barron's subscription for 6 months (26 issues) at \$32. I understand that upon receipt of payment I will receive Dr. Martin E. Zweig's booklet "The ABCs of Market Forecasting."

☐ I prefer 1 year of Barron's at \$63
☐ Payment Enclosed ☐ Bill me
☐ Please charge my ☐ American Express
☐ VISA ☐ MasterCard ☐ Diners Club

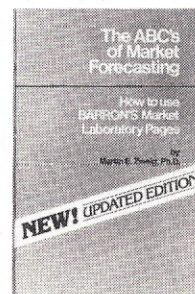
Card # _____ Expires _____

Name _____ Signature _____

Address _____

City _____ State _____ Zip _____

This offer is valid in the U.S. and its possessions for a limited time only. Allow 4-6 weeks for delivery of your bonus booklet by Dr. Martin E. Zweig.



6NGX

GEMS OF WISDOM

Avoiding Explosions

Don't use more than one electrical wall outlet when plugging in your computer, terminal, printer, or other interconnected equipment.

I learned this lesson not from a manufacturer's manual, but from watching an "expert" in the business plug in his equipment. First, and most critical, he made no effort to check the electrical circuit he was going to use. He just plugged the computer into one wall outlet, and the terminal into another. Next, he had to connect the cable between the terminal and the computer. That's when his problems started. As soon as the cable connection was made between the terminal and the computer, there was an electrical explosion in both pieces of equipment—even though none of the switches was turned on.

Investigation revealed that one of the wall outlets had reversed polarity. In other words, the ground and hot circuits had reversed positions at the outlet. With any other electrical appliance, such as a radio, TV, fan, etc., the reversal would have had no adverse effect. However, with computers and peripherals with multiple electrical plugs that must be interconnected with exterior cables, correct electrical circuits are critical.

So, prior to use, all electrical circuits should be tested for a minimum of correct polarity. A simple three-light polarity tester is available at most Radio Shack stores for about \$7. Even with reversed polarity, though, I believe that if all the equipment had used the same three-prong outlet, the equipment would not have been damaged.

Ernest R. Thomas
SANTA ROSA, CA

This Gem of Wisdom wins \$25 for Ernest Thomas. If you have an anecdote, tip, or secret to share, send it (up to 250 words) to Gems of Wisdom Editor, Personal Computing, 50 Essex St., Rochelle Park, NJ 07662.

LAW

outweigh the money to be gained by bringing suit, the manufacturer will probably drop the charges.

Penalties for infringement

The copyright owner is entitled to actual damages. In the case of a \$200 computer program, it's difficult to specify what those damages would be. One form of damages might be the purchase price that wasn't received for the lost sales. But actual damages are complicated and difficult to show, so the 1976 Copyright Act also provides for so-called statutory damages that can be invoked instead. The statutory damages are not less than \$250 and not more than \$10,000 per infringement. The amounts vary with the number of works infringed upon, but not with the number of pirate copies generated at any one time.

In addition, the manufacturer can seek an injunction against the violator and impoundment of the infringing copies. Injunctions are typically what people use copyright law for, and they are a very powerful deterrent. If the case goes to trial, the lawsuit can run for years. Even before the case comes up, one alternative available to litigants is the temporary restraining order or preliminary injunction. The certificate of copyright registration is prima facie evidence of the rights assigned under the Copyright Act: "Here, your honor, I am the owner of the copyright of this particular work, and this guy's made copies of it. They weren't authorized copies. Make him stop." Often that is enough to get the copyright owner a preliminary injunction. If that preliminary injunction is granted, in most circumstances the case is over right there. Basically the defendant is out of business, with an enormous incentive to settle.

Finally, there are criminal penalties for copyright infringement. Fines of up to \$10,000 or one year's imprisonment, or both, are possible punishments for willful infringement


"for purposes of commercial advantage or private financial gain." Because it's such a headache to bring suit against individuals in the home or office, manufacturers try to discourage casual illegitimate copying by coding programs so as to make copying difficult (which has, by the way, given rise to a whole new industry of nibble copiers to defeat those codes). Manufacturers also structure their support to deny service to those with black market copies. Often the most important thing to a private user is his ongoing relationship with the manufacturer. He relies on this for updates, modifications, follow-on products, help with problems and questions, and essential long-term maintenance. If, for example, you try to call some software companies for help, the first thing they want to know before they talk to you is the serial number of your particular copy of the program. Sometimes this is honored more in the breach than in the observance, but the serialization process does give the manufacturer the power to exclude you from the support that is critical to you.

Rule of thumb

In general, if you make copies or modifications for archival purposes or for your own use alone, you're not violating copyright law, and you may not be violating a license. But once you hand a copy of either the unaltered or the modified work to someone else while retaining the original or a copy for yourself, chances are excellent that you have infringed on someone else's copyright.

If you have legal questions regarding personal computing and the law that you would like to see discussed in future columns, address them to:

Trudy E. Bell, Associate Editor
Personal Computing
50 Essex Street
Rochelle Park, N.J. 07662

Sorry, we cannot personally answer or acknowledge questions. 

**YOU
CAN MAKE
A FORTUNE
IN MICROS!**

THE MICRO COMPUTER BUSINESS WILL GROW FROM \$10 TO \$100 BILLION IN THE NEXT EIGHT YEARS! ARE YOU READY TO CASH IN?

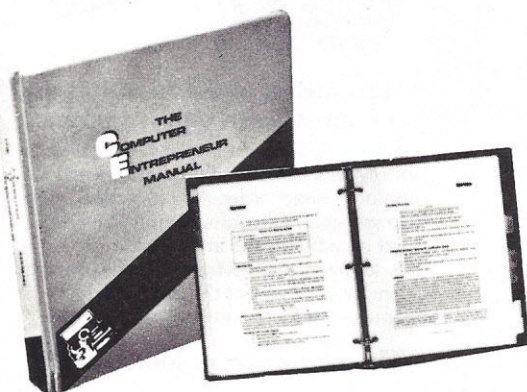
The micro computer business is predicted to grow from its present \$10 billion to \$100 billion before 1990! Imagine the possibilities this opens for you! No matter where you live, if you're starting up or presently in business, **no other industry offers you more opportunities!**

Now, finally, all the inside information you need to secure a prosperous future in this dynamic industry is available in **one place - THE COMPUTER ENTREPRENEUR MANUAL!** - An immense information source, compiled by our inquisitive research team, aided by a panel of experts and business people from all areas of the computer industry!

We present the inside story of more than 100 lucrative computer businesses you can enter, where you'll find the real opportunities for the eighties: from one man operations like Programming Author, Word Processing Center or Consulting, to Systems House, Service Bureau, Computer Store etc! Many at little or no investment! All the invaluable facts and figures: How to start, Capital needs, Profit estimates and Margins, How to Sell and Market, How missing technical or business experience need not stand in your way, Source of Suppliers, etc! Details that could take years to find out on your own!

We'll show you inside tricks, like how to never again pay retail for computer products and consumer electronics, even for one item - right now, while you're starting your business! How to get free merchandise and trade show invitations, etc. This alone will more than pay for the manual! You'll read actual case histories of other computer entrepreneurs, so you can learn from their mistakes, and profit from their success stories! Where you'll be one year from now depends on your actions today! Let us show you how to take the first crucial steps!

Order now and take advantage of our limited introduction special, THE COMPUTER ENTREPRENEUR MANUAL, and a six month subscription to THE COMPUTER ENTREPRENEUR REPORT/NEWSLETTER (so you're always up-to-date with the industry), both for only \$29.95! You must be convinced on how easy you can strike it rich in the micro computer business - or you may return the manual for a full refund within thirty days! USE OUR TOLL FREE NUMBER TO ORDER!



EVERYTHING YOU NEED TO KNOW TO SUCCEED IN THE COMPUTER BUSINESS IS ALL IN THIS MANUAL!

THE COMPUTER ENTREPRENEUR MANUAL has the answers to all your questions about selecting, starting and successfully running a computer business! There has never been such a comprehensive collection of know-how and information about this business in one place! All the facts you need to plan and achieve your goals in easy-to-follow, step-by-step instructions!

These are some of the 100-plus businesses covered in PART ONE of the manual, with the facts on How to start and run, Start-up Cost (Even how to operate on a shoestring), What profits to expect, Wholesale prices, Mark-ups, Suppliers, future outlook, case histories for each, etc:

Systems House, Software Author (who to sell to and who to avoid), Service Bureau, Software Publisher (How to find programs that sell, Word Processing Service, Consulting and Consultant Broker (use your skills or those of others, make \$150 - \$1000 a day!), The incredible Games Business, Computer Store (Franchises: Pro and Contra, or a low inventory store in your home!), OEM, Hardware Mfg, Data base and Teletext Service (big prospects!), Used Computers, Repairs, Rent-A-Computer, Promote Fests and Trade Shows, Turnkey Systems,

Bartering, Mail Order, Compile and rent mailing lists, Specialized Data Headhunting and Temp Help Service, Tech Writer Shop, Custom Engineering, The highly profitable Seminars and Training Business, and many more!

Many new ideas and ground floor opportunities! Interviews and success stories on companies of all sizes! Privy info on the profits made: How some computer store operators net \$100 - \$250,000! Little known outfits that made their owners millionaires, one of these low-key companies, making simple boards, went from nil to \$20,000,000 and 100 employees in four years! Programmers that make \$300,000, Thousands of micro millionaires in the making, etc!

Whatever your goal is - Silicon Valley Tycoon, or just a business at home - we guarantee you'll find a business to suit you - or your money back!

PART TWO of the manual is loaded with the know-how and "streetfighting" savvy you need, both as a novice or business veteran, to get started, to stay and to prosper in the micro computer business! A goldmine of information in clear and easy-to-use instructions: How to prepare your Business Plan, Outside financing, The mistakes you must avoid, How to hire and manage employees, Incorporation (when, and how to do it cheaply), Surviving bad times, Record Keeping, how to estimate your market before you start, Use multiple locations to maximize profits, how to promote and stay steps ahead of the competition! How to get free advertising, free merchandise, free advice, Power negotiating with suppliers to double your profit margins, etc! Even how to keep a present job while starting a business part time!

Don't miss this opportunity to be part of this great industry - the next success story could be your own! Order the manual today! Part one and two, bound in a deluxe ring binder, where you can also collect our newsletter (free for six months with the manual - a \$32.50 value!) - all for only \$29.95!



THE COMPUTER ENTREPRENEUR NEWSLETTER - ALL THE LATEST INSIDE BUSINESS NEWS! NOW! SIX MONTHS FREE WITH YOUR MANUAL!

You're always attuned to the industry, and your manual kept up-to-date, with our newsletter! Each issue has the latest business news, ideas, new suppliers, our indispensable "watchdog" column on profits, discounts (don't miss mfg's promos, like recently, when top video monitor sold at \$80 - that's half wholesale, one third of the retail price!), the competition, the big deals, etc! Feature stories with start-up info and case histories on new micro businesses!

You'll get invitations to trade shows and conventions, the usage of our advisory service and our discount buying service for your purchases!

You'll find many items in our newsletter that will save you the cost of your manual many times over!



**CALL TOLL FREE!
CHARGE IT!**
Credit Card Orders
(MC, VISA only)
accepted 24 hours/day
1-800-227-3800
Ask for extension 1135
In California call
1-800-792-0990



Order by phone (Credit cards only), or use the coupon:

Mail to THE COMPUTER ENTREPRENEUR PUBLISHING CO.
PO BOX 456, Grand Central Station, New York, N.Y. 10163

Please send me THE COMPUTER ENTREPRENEUR MANUAL, and the six month free subscription to THE COMPUTER ENTREPRENEUR REPORT/NEWSLETTER. All for only \$29.95, plus \$3 for postage/handling (NY residents: add \$2.64 for sales tax). If I decide not to keep the manual, I may return it within 30 days for a full refund.

NAME: _____

ADDRESS: _____

CITY, STATE, ZIP: _____

☐ Check or M.O. enclosed Charge to ☐ VISA ☐ MC

CARD#: _____

Exp. Date: _____

SIGNATURE: _____

PEO583

Introducing the portable computer for professionals on the move. Hewlett-Packard's new HP-75.

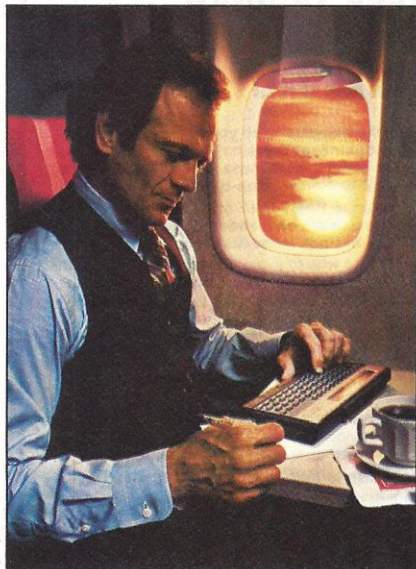
A decade ago, we introduced the world's first scientific pocket calculator and rendered the time-honored slide rule obsolete.

Now we're introducing the HP-75 portable computer. And if press reaction is any indication, history is about to repeat itself.

As small as a book. As powerful as a personal.

Desktop-computer power in a handsome 26-ounce package. That's the HP-75. It's just 10 inches by 5 inches by 1¼ inches.

But don't let the compactness fool you. Inside its rugged case lies a 48K-byte, ROM-based operating system. With a comprehensive, 147-command instruction set that helps you write hard-working, memory-efficient BASIC programs.



Plug-in ROM ports let you add up to three 32K-byte software modules—modules that solve tough problems *without* sacrificing user memory.

And that user memory gives you up to 24K bytes of program and data storage.

It all adds up. A fully loaded HP-75 is a 168K-byte computing powerhouse in calculator clothing.

Want more? A built-in magnetic card reader provides a convenient, inexpensive way to store and retrieve programs or data.

The HP-75's typewriter-like keyboard means rapid, accurate entry of text or data. And when we say you can touch type on it, we *mean* you can touch type on it.

Those keys, by the way, can be redefined with your favorite commands or programs. Up to 196 unique key combinations in all.

Immediate, convenient access to your most frequently used programs.

Thanks to the HP-75's multiple-file

structure, programs, data and text can be named, simultaneously stored in memory, and programmed to interact with each other.

Add continuous memory, and you've got a computer that's designed to solve problems on the go. Simply load your favorite files and enjoy immediate access to any or all of them. The files are retained in memory until you decide to delete them—even when the machine is turned off.

Time and appointments to keep you on schedule.

The TIME key brings to display the day of the week, date and time to the nearest second.

The APPOINTMENT feature reminds you—an hour from now or a year from now—of things you have to do. You can have a silent message on the display, any one of six alarms, or a combination of both.

Even if the machine is turned off, it will "wake up" and alert you of an appointment. Or it will execute programs or control peripherals according to predetermined schedules.

In an environmental test, for instance, where readings are taken every half hour, the HP-75 can make sure its owner gets the weekend off.

Software tailored to solve your specific problems.

HP-75 software is now available in areas such as math, engineering, finance, and statistics. With VisiCalc[®] on the way.

Our plug-in math module^{*}, for instance, solves polynomial roots, evaluates integrals, and performs finite Fourier transforms.

With our text-formatter module^{**} you'll compose memos, letters, and short documents virtually anywhere; then print them out when you return to your home or office.

In addition, our third-party software program assures you of ever-expanding software variety.

If you're a volume purchaser or OEM, give us a call. We can help you create custom HP-75 systems with special plug-in modules, magnetic cards, digital cassettes, and keyboard overlays.

Peripherals for a total computing package.

The HP-75 is equipped with the Hewlett-Packard Interface Loop, giving you a choice of 15 peripherals. (And that choice is expanding. The HP-75 can work simultaneously with up to 30.)

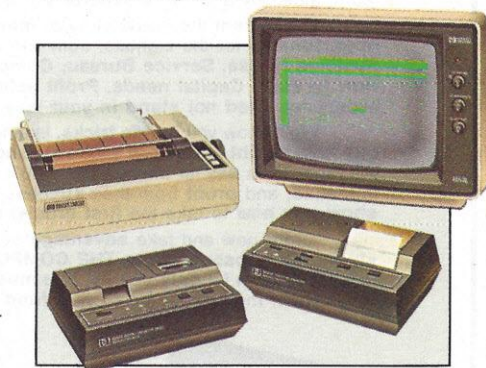
In a battery-powered briefcase system weighing about seven pounds, you might have the 24-character printer, digital cassette drive and acoustic modem^{***}.

A desktop system might include the 80-column impact printer, full-color graphics plotter, and 12-inch video monitor.

And the HP-75 can "talk to" other computers, peripherals, and instruments with our HP-IB (IEEE-488)^{**}, RS-232^{*}, and

GPIO interfaces.

In summary, the HP-75 is the heart of an extremely versatile system, in addition to its stand-alone capabilities.



Manuals to make sure you get the most from your machine.

Chock-full of examples and helpful hints, our owner's manual will get you up and running in short order. And it's organized to help you access the information you need to get on with the job at hand.

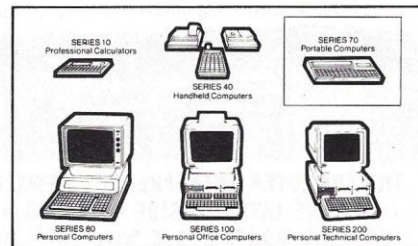
A supplementary reference guide provides a concise summary of the computer's operating protocol and instruction set.

The value you're looking for.

What is the price of all this power in this compact package? \$995^{****}. A lot less than you might pay for a personal computer you can't take with you.

See the HP-75 today. It's the smart choice for professionals on the move.

For the authorized HP dealer or HP sales office nearest you, call TOLL-FREE 800-547-3400 (Oregon, Alaska, Hawaii: 503-758-1010). TTY users with hearing or speech impairments, dial 503-758-5566.



^{*}Available May 1, 1983.

^{**}Available March 1, 1983.

^{***}Call our toll-free number for availability.

^{****}Suggested retail price. May vary outside U.S. Peripherals and software not included.

VisiCalc[®] is a registered trademark of VISICORP.



HEWLETT PACKARD

1 1/4"

CIRCLE 62



HP-75 SPECIFICATIONS

Size and weight: 10" X 5" X 1 1/4," 26 oz.

48K-byte, ROM-based operating system:

- 8-bit CMOS CPU • Multiple file structure in continuous memory • Instruction set: 52 system commands, 43 BASIC commands, 41 numeric functions, 7 string functions, 6 time-mode commands, 16 arithmetic/logical/

relational operators

Numeric precision:

- Real—12 digits ($\pm 9.999999999999 \times 10^{\pm 499}$)
- Short—5 digits ($\pm 9.9999 \times 10^{\pm 99}$)
- Integer—5 digits (± 99999)

Time/appointments:

- Perpetual clock/calendar • 12- or 24-hour format • Appointment control of command/

program execution

Memory:

- User (RAM)—16K bytes, expandable to 24K bytes • Operating system (ROM)—48K bytes
- Plug-in software (ROM)—up to 96K bytes (3 32K-byte modules)

Typewriter-like QWERTY keyboard:

- 65 keys • 194 redefinable key combinations

• "Hidden" numeric keypad

Integral mass storage: hand-pulled card reader (1.3K bytes per card)

Built-in interface: HP-IL; choice of 15 peripherals

Power supply: 3 AA NiCad batteries (AC adapter/charger included)

Liquid-crystal display: 32-character window on 96-character line

PG02308289D

How to get top-quality printing for your IBM PC.

Without paying top dollar.



To get the most out of your IBM PC, you need a professional letter-quality printer. Not just somebody's converted typewriter. Why compromise your computer investment with a makeshift add-on? Especially when Qume's SPRINT 11 PLUS™—one of the world's best, most reliable printers—is so affordable. It plugs right into your PC, turns out letter-perfect print at 40 characters per second, and works beautifully with your IBM PC business software. Including sophisticated word processing packages. So don't be fooled by low-price, low-performance printers. And don't spend more than you need to. Choose the dependable, premium-quality SPRINT 11 PLUS from Qume. It's the best printer you can buy for your IBM-PC. And the best buy in printers.

For full details on the SPRINT 11 PLUS, contact one of the convenient Qume distributors listed. Qume Corporation, 2350 Qume Drive, San Jose, California 95131.

Abacus Data Services
(416) 677-9555 Ontario

Anacomp
(213) 516-7480 CA
(206) 641-4990 WA
(206) 881-1113 WA
(509) 624-1308 WA
(800) 426-6244 Outside WA

Anthem Systems
(415) 342-9182 CA

Audio Visual Services
(713) 659-1111 TX
(800) 392-7770 TX Only

Bohlig and Associates
(612) 922-7011 MN

Butler Associates
(203) 653-7158 CT
(617) 964-5270 MA

Byte Industries
(800) 972-5948 CA Only
(800) 227-2070 Outside CA

C & G Distributors, Inc.
(513) 435-4340 OH
(800) 245-1084 Outside OH
(412) 366-5056 PA
(800) 245-1084 Outside PA

D. J. Carlyle Corp.
(213) 277-4562 CA
(714) 640-0355 CA
(415) 254-9550 CA
(808) 531-5136 HI
(312) 975-1500 IL
(201) 780-0802 NJ
(214) 458-0888 TX
(713) 530-4980 TX

Computer Mart of N.J.
(201) 283-0600 NJ

Computermart Corp.
(505) 883-0048 AZ
(602) 997-8900 AZ
(303) 773-1169 CA
(904) 878-4121 FL
(404) 458-6500 GA
(704) 542-0091 NC
(512) 654-4711 TX

Datamex Ltd.
(613) 224-1391 Ontario
(416) 781-9135 Ontario
(514) 481-1116 Quebec
(604) 684-8625 Vancouver

Data Systems Marketing
(602) 833-0061 AZ
(916) 891-8358 CA
(714) 540-2312 CA
(209) 237-8577 CA
(213) 344-7097 CA
(213) 641-2050 CA
(415) 941-0240 CA
(213) 796-2562 CA
(213) 796-2631 CA
(714) 560-9222 CA
(213) 344-7097 CA
(303) 371-4140 CA
(303) 694-1710 CA
(313) 254-2830 MI
(406) 586-1511 MT
(603) 673-0765 NH
(505) 294-1531 NM
(503) 641-2469 OR
(412) 486-2676 PA
(214) 960-1604 TX
(713) 789-0803 TX
(801) 292-6666 UT
(206) 575-8123 WA

Datatech Systems, Ltd.
(403) 483-3947 Alberta
(416) 255-9351 Ontario
(604) 765-7781 Victoria

Data Technology Industries
(415) 638-1206 CA
(910) 366-2072 (TWX)

Data Terminal Mart
(403) 270-3737 Alberta
(403) 420-1755 Alberta
(604) 872-8482 B.C.
(902) 469-3782 Nova Scotia
(416) 495-2001 Ontario
(416) 677-0184 Ontario
(613) 725-5196 Ontario
(416) 245-4780 Ontario
(514) 288-1555 Quebec

Equipment Resources
(404) 995-0313 GA
(901) 794-4635 TN

General Electric
(205) 479-6547 AL
(602) 278-8515 AZ
(714) 231-0309 CA
(415) 436-9260 CA
(203) 628-9638 CT
(202) 737-6211 DC
(305) 921-0169 FL
(904) 751-0815 FL
(305) 904-7723 FL
(404) 452-4913 GA
(404) 452-4919 GA
(219) 933-4500 IL
(217) 424-8495 IL
(312) 780-2994 IL
(812) 473-6161 IN
(317) 241-9330 IN
(219) 933-4500 IN
(319) 285-7501 IA
(502) 452-3311 KY
(301) 332-4710 MD
(617) 938-1920 MA
(800) 343-4411 MA
(612) 522-4396 MN
(816) 231-6362 MO
(314) 993-0537 MO
(201) 227-7900 NJ
(609) 488-0244 NJ

(716) 876-1200 NY
(201) 227-7900 NY
(518) 385-4888 NY
(704) 525-3011 NC
(513) 874-8512 OH
(216) 441-6111 OH
(503) 221-5095 OR
(901) 527-3709 TN
(214) 243-1106 TX
(713) 672-3575 TX
(801) 973-2253 UT

Gentry and Associates
(205) 534-9771 AL
(305) 791-8405 FL
(305) 859-7450 FL
(813) 886-0720 FL
(404) 998-2829 GA
(504) 367-3975 LA
(919) 227-3639 NC
(803) 772-6876 SC
(901) 358-8629 TN
(615) 977-0282 TN

Inland Associates
(913) 764-7977 KS

InterACT Computer Systems
(305) 331-7117 FL
(404) 953-8213 GA
(704) 254-1949 NC
(704) 552-7502 NC
(919) 275-3305 NC
(919) 876-6379 NC

Kierulff Electronics
Manchester Electronics
(800) 342-1382 CT

MicroAmerica
(800) 421-1485 CA
(800) 262-4212 CA
(617) 431-7660 MA Only
(800) 343-4411 Outside MA
(800) 527-3261 Outside TX
(800) 442-5847 TX Only

Micro Computers of New Orleans
(504) 865-5883 LA

Natl. Computer Syndicate
(312) 459-6400 IL

Pac. Mountain States Corp.
(213) 989-6113 CA

PAR Associates
(602) 243-4267 AZ
(303) 371-4140 CA
(801) 292-8145 UT

Pioneer Electronics
(205) 837-9300 AL
(305) 859-3600 FL
(305) 771-7520 FL
(404) 448-1711 GA
(301) 948-0710 MD
(919) 273-4441 NC
(215) 674-4000 PA

Pioneer Std. Electronics
(312) 437-9680 IL
(317) 849-7300 IN
(313) 525-1800 MI
(612) 935-5444 MN
(216) 587-3600 OH
(513) 236-9900 OH
(412) 782-2300 PA
(512) 835-4000 TX
(214) 386-7300 TX
(713) 988-5555 TX

Schweber
(205) 882-2200 AL
(213) 999-4702 CA
(213) 537-4321 CA
(916) 929-9732 CA
(408) 496-0200 CA
(203) 792-3500 CT
(305) 331-7117 FL
(305) 927-0511 FL
(404) 449-9170 GA
(312) 364-3750 IL
(319) 373-1417 IA
(301) 840-5900 MD
(617) 275-5100 MA
(313) 525-8100 MI
(612) 941-5280 MN
(201) 227-7880 NJ
(716) 424-2222 NY
(516) 334-7474 NY
(216) 464-2970 OH
(513) 439-1800 OH
(918) 622-8000 OK
(215) 441-0600 PA
(412) 782-1600 PA
(512) 458-8253 TX
(214) 681-5010 TX
(713) 784-3600 TX
(414) 784-9020 WI

Tek Aids Industries Inc.
(312) 870-7400 IL
(512) 835-9518 TX

Terminal Rentals, Inc.
(602) 258-4466 AZ
(213) 637-3413 CA
(714) 235-9268 CA
(415) 956-4821 CA
(408) 292-9915 CA
(714) 832-2414 CA

Terminals Unlimited
(800) 336-0423
(800) 572-0164 VA
(703) 237-8666 VA

Unico
(412) 451-0251 TX

Victor Electronics
(617) 481-4010 MA

Western N.Y. Computer
(716) 381-4120 NY

2M Corporation
(201) 625-8100 NJ

BOOK REVIEWS

Videoplace: A Vision Of The Future

ARTIFICIAL REALITY

MYRON W. KRUEGER
ADDISON-WESLEY PUBLISHING CO.
READING, MA
312 pp., \$10.95

Myron Krueger's *Artificial Reality*, a vision of the future, will intrigue readers interested in computer-controlled art forms and environments. Krueger, a professor of computer science at the University of Connecticut, has been experimenting with such environments for several years. His may well be a vision of the near future.

The book describes some of Krueger's work in this field, and offers a look at a time when art will join technology to produce a computer-assisted responsive environment promising psychological comfort, aesthetic pleasure, and improved communications. If this book is any sort of guide, this Brave New World could be a lot of fun.

Krueger, who moves easily between the world of computers and the works of artists such as composer John Cage and painter Jackson Pollock, has conceived a computer-controlled, shared visual environment called Videoplace. In its simplest form, Videoplace is a room where one wall is used for rear-screen video projection. When a participant walks into the room, his image is picked up by a TV camera, digitized, and processed by a computer that produces a life-size image on the video wall.

Two or more Videoplaces can also be linked, and composite images can be shown in both environments, allowing purely electronic meetings and activities to take place. Additional images can be added, so par-

ticipants may appear to be climbing a mountain or swimming in the sea, for example. The possibilities are endless.

Krueger envisions even more complex Videoplaces with sensors to detect body movement and transducers to produce tactile sensations. Two people in different Videoplaces would not only see images of each other as though they were in the same place, but would also have the sensation of touch.

Unlike the telephone with its usually brief, voice-only contact, Videoplaces hold the promise of extended communication even when no words are spoken. Imagination is the only limit to the types of human communication that could be simulated in a responsive environment.

While Videoplaces have some obvious applications in work and education, Krueger also sees influence on traditional arts—dance, theater, poetry, writing, painting, and sculpture. Ideas such as kinetic poetry or the interactive novel may sound strange to our conventional ears, but Krueger bubbles with enthusiasm for these uses of his visions.

In the concluding chapter of this stimulating book, Krueger makes a passionate plea for support for the types of experiments he has been working on, and for progress in technology and science for human betterment. He sees change as a virtue and urges that the nation renew its commitment to progress. However, he's concerned with more than the purely practical. Krueger wants us to enjoy ourselves while we put the fruits of technology to work. A little whimsy is not a bad thing, he seems to say. Read *Artificial Reality* and enjoy it. —Jeffrey Bairstow

OMEGA

INTERNATIONAL

SAVE ON ... COMPUTERS • MONITORS PRINTERS • PERIPHERALS • SUPPLIES*



**OMEGA
BLOCKBUSTER
SPECIAL**

**AMDEK
COLOR I MONITOR**

\$289

Manufacturers
Suggested
Retail Price
449.00

Offer Good Thru 5/31/83

NEW! EPSON FX-80 PRINTER

Now Available
For Immediate Delivery!

- Up To 160 cps • 11 x 9 Matrix • Pinfeed Platen
- Proportional Spacing • Graphics • Elite Pitch
- Centronics Parallel Interface • Internal 2K Ram

It's All New...And It's OMEGA PRICED!
For Our Price...CALL 1-800-343-0873 TODAY!

SAVE ON LETTER QUALITY PRINTERS

DIABLO 620 New Low Price	929.00
DIABLO 630 w/API & cable	1,749.00
NEC 3510 SPINWRITER	1,399.00
NEC 7710 SPINWRITER	2,045.00
NEC 7730 SPINWRITER	2,095.00

BIG SAVINGS ON ACCESSORIES

HAYES SMARTMODEM 300 Baud	230.00
HAYES MICROMODEM II (APPLE II)	289.00
MICROSOFT SOFTCARD PREMIUM SYSTEM	459.00
ORANGE MICRO GRAPPLER +	120.00
PKASO PRINTER CARDS	129.00
RANA ELITE I (APPLE II)	299.00
SIGNALMAN MODEMS (MK I) As Low As ..	85.00

ACCESSORIES & SUPPLIES

OMEGA Has A Complete Line of Accessories & Supplies for the Apple II and many other Popular Computers by manufacturers like:

- D. C. Hayes • Microsoft • Tymac
- M & R Enterprises • Mountain Computers
- Kensington Microware • Practical Peripherals
- T.G. Products • Videx

SOFTWARE

Omega Carries Software by the following companies:

- American Business Systems • Ashton Tate
- Dakin 5 • Innovative Software • Microsoft
- Sorcim • Stoneware • Visicorp

DOT MATRIX PRINTER BARGAINS

C-ITOH PROWRITER 8510 AP	399.00
IDS MICROPRISM 480	549.00
OKIDATA MICROLINE 92 (NEW)	549.00
OKIDATA MICROLINE 93 (NEW)	859.00
STAR MICRONICS GEMINI 10	349.00

MONITOR SPECIALS FROM OMEGA

AMDEK 300 G	139.00
AMDEK 300 A	165.00
NEC JB1260	119.00
NEC JB1201 M	169.00
USI Pi-2 12" GREEN MONITOR	159.00
USI Pi-3 12" AMBER MONITOR	179.00

MAGNETIC MEDIA

OMEGA Stocks Diskettes by:

- Dysan • Elephant • Maxell • Verbatim

- All Equipment Factory Fresh w/ MFT Warranty
- Prices Do Not Include Shipping Charges
- Mass. Residents Add 5% Sales Tax
- All Returns Subject To Restocking Fee

CUSTOMER PICKUP NOW AVAILABLE

334 R Cambridge St., Burlington, Mass.
(617) 229-6464



CALL TOLL FREE!
1-800-343-0873
Call Toll Free for Ordering.
All Others call (617) 229-6464

CHARGE IT!
MasterCard / Visa
WELCOME AT NO
EXTRA CHARGE

* PRICES, SPECIFICATIONS AND AVAILABILITY OF ADVERTISED MERCHANDISE SUBJECT TO CHANGE WITHOUT NOTICE

UNADVERTISED SPECIALS ON • COMREX • EPSON • NEC • IDS PRISM • OKIDATA

OMEGA INTERNATIONAL

334 R CAMBRIDGE STREET, BURLINGTON, MA. 01803

How to handle a sea of data

DATA BASE MANAGEMENT SYSTEMS

DAVID KRUGLINSKI
OSBORNE/MCGRAW-HILL
BERKELEY, CA
260 pp., \$16.95

To many small businessmen, the phrase "data-base management system," or DBMS, conjures up images of huge corporations with volumes of records on customers, products, and employees. Yet small businesses frequently generate sufficient data to justify the use of the same computer techniques used by large corporations for data management. A simple list of customers can be manipulated and maintained with a DBMS that offers more than the basic mailing-list program. Note the word "manipulation." It is this ability to perform actions on data that distinguishes a DBMS from a simple record-keeping file manager.

The establishment and use of a DBMS is no simple matter, however. Setting up a computerized data base will often require a high degree of raw data organization. Considerable effort must be devoted to determining how the data are to be accessed. Interfaces with other programs such as accounting packages must be considered. In fact, expert assistance is often needed before a small business can set up and use a DBMS. Thus, David Kruglinski's book is a welcome addition to the personal-computer software bookshelf. Subtitled "A Guide to Microcomputer Software," the book looks at both data-base management systems and software packages.

This is not a book for the home-computer owner. Using a DBMS to keep your Christmas card list, for example, is rather like using a jackhammer to crack a peanut. There are easier ways. The data-base manage-

ment systems described by Kruglinski are intended for serious business applications, just like the packages offered by IBM and DEC for their mainframe computers. Kruglinski's book is aimed at the small businessman who is already using a personal computer and is ready to tackle applications beyond routine accounting.

Kruglinski's book begins with a look at simple file-management systems (FMS), and proceeds to two main types of data-base management systems—relational, and network or hierarchical. In the relational system, data are stored as files that resemble the tables of a spreadsheet calculator. Relationships between the rows and columns can be modified with a kind of electronic "cut and paste" technique, and changes can be made in the data base with simple commands. In the network system, data are stored in a tree-like, hierarchical form. A data description language explains the structure of the data, and a data manipulation language allows the user to work with the data. This network system is more sophisticated and more difficult to use than the relational system, but Kruglinski carefully spells out the pros and cons of each type.

The book's three introductory chapters are must reading for the DBMS novice. The real meat of the book, however, is in the chapters that review four commercial software packages. Studying these sections is the next best thing to having hands-on experience with each of the four systems, a process to be encouraged before a purchase is made. Two of the systems mentioned—the Condor 20 from Condor Computer Corp., and dBASE II from Ashton-Tate—are relational. Another—FMS-80 from DJR Associates—is a file-management system. The fourth and most complex—the MDBS III from Micro Data Base Systems—is a true hierarchical system. These four data-base management systems run under

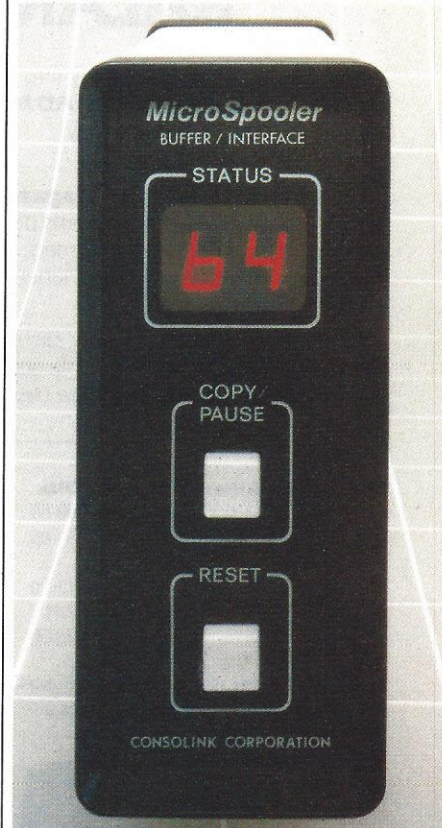
MicroSpooler® Saves Time

MicroSpoolers mean an end to waiting. The MicroSpooler stores data and feeds it to your printer as fast as it can handle it. You don't lose valuable computer time waiting for the printer to do its job.

Easy to install. Easy to use. Easy on the budget. These stand-alone MicroSpoolers can be installed in-line between virtually any printer and any computer.

Features:

- 16K memory (user expandable to 32K or 64K)
- Status readout
- Internal power supply
- Vertical mount configuration
- Independently selectable baud rates and handshaking
- Satisfaction guaranteed
- Priced from \$199.00



Send or call toll free for literature on our complete Spooler lines.

CONSOLINK CORPORATION

Dept. 2-49
1840 Industrial Circle
Longmont, CO 80501
(303) 651-2014
800-525-6705

CIRCLE 65

TRS-80
MODEL I MODEL III

In the
center ring ...



GREAT PROGRAMS DELIVERED ON DISK OR TAPE WHILE KEEPING YOUR BUDGET BALANCED!!!

Hurry, hurry! Put a little variety into your computing life! Step right up to the quality programs from **CLOAD Magazine** — and have enough money left over for cotton candy!

A subscription to **CLOAD Magazine** consists of 6 to 8 ready-to-load useful, practical, and fun programs delivered by First Class Mail every month. Some of our past performers: Loan Amortization, Menu, Ship Adventure, Bond, Cave Raider, Planets, and Shrink.

Don't clown around (another cliché!). Get a subscription to **CLOAD Magazine**. Or just catch a single act and try a back issue. You'll be dazzled by the Greatest Software Deal on Earth!

The Bottom Line:	Tape	Disk
1 year (12 issues)	\$50.00	\$95.00
6 months (6 issues)	\$30.00	\$55.00
Single Copies		
Back Issues	\$ 6.00	\$11.00
Good Games #1	\$12.00	\$23.00
Adventures #1	\$12.00	\$23.00

California residents add 6% to single copies. North America — First Class postage included. Overseas — add \$10 to subscriptions and \$1 to single copies. Sent AO rate.

The Fine Print: Issues from Oct 78 available on tape. Issues from Oct 82 available on disk, also. Ask for list (Level I issues also available).

CIRCLE 53



MasterCard/Visa
P.O. Box 1448
Santa Barbara,
CA 93102
(805) 962-6271

If you have a Radio Shack Color Computer or TDP System 100 there is Chromasette Magazine with programs on tape especially tailored for your system.

P.O. Box 1087, Santa Barbara, CA 93102 (805) 963-1066



CIRCLE 54

BOOK REVIEWS

CP/M, but versions are available for other machines such as the IBM Personal Computer.

The first two systems will be of most interest to personal-computer users, and Kruglinski's reviews of them are detailed and helpful. As the author admits, there are other useful DBMSs, such as those intended specifically for the Apple or TRS-80. A few of these are briefly described in a later chapter, but no mention is made of the products available from VisiCorp, which is an unfortunate omission. An additional chapter that reviews file-management systems would also be helpful to the personal-computer user.

—Jeffrey Bairstow

A tour of a spreadsheet

MASTERING VISICALC

DOUGLAS HERGERT
SYBEX, INC.
BERKELEY, CA
217 pp., \$11.95

Someday—hopefully soon—computer manufacturers and software suppliers will realize they should be hiring people like Douglas Hergert to write their manuals. Until they do, they'll continue to support a whole industry that flourishes because some of the best machines and the most versatile software are accompanied by manuals written by and for programmers and engineers—which is to say, they are largely unintelligible to the rest of us. A company produces a terrific piece of software and, sooner or later, someone comes along to explain to the uninitiated how the software works and how to use it.

Douglas Hergert has done precisely that, and busy executives and entrepreneurs who can most benefit from using VisiCalc—but who have neither the time nor the inclination to

plow through computerease—should be glad he did. (Perhaps we should mention, for newcomers, that VisiCalc is an electronic spreadsheet that has rapidly become the most popular “decision support system,” especially among personal-computer users. Among its other wonders is its ability to reduce days of “what-if” calculations to a few strokes on a keyboard.)

To be sure, *Mastering VisiCalc* is intended for beginners. The author takes the reader through a brief, lucid, and surprisingly comprehensive tour of VisiCalc’s capabilities, with special emphasis on home, office, and scientific applications. He then goes through a hands-on instructional that quickly gets the user into the program and establishes a rapport between novice and spreadsheet.

But even people who have worked with VisiCalc for a while can derive considerable benefit from *Mastering VisiCalc*. In gradual, easy stages, the book progresses to more advanced applications. Of particular value are the three chapters on Data Exchange Format (DEF) files—what they are, how to read them, and how to write them, using BASIC. (Essentially, they’re the permanent files created by and with VisiCalc that the user wants to save, either for record purposes or for later referral.) The appendix on BASIC, while relatively brief, could stand alone as an introductory text or a refresher course. Another appendix discusses file-handling subroutines for the Apple, the TRS-80, and the IBM Personal Computer.

The book is well illustrated with charts and screen displays, as well as actual programs printed, refreshingly, so that the middle-age executive won’t need a magnifying glass to read them.

If you already have VisiCalc, but haven’t explored its full potential, pick up a copy of *Mastering VisiCalc* at the book store and leaf through it; (continued on page 146)

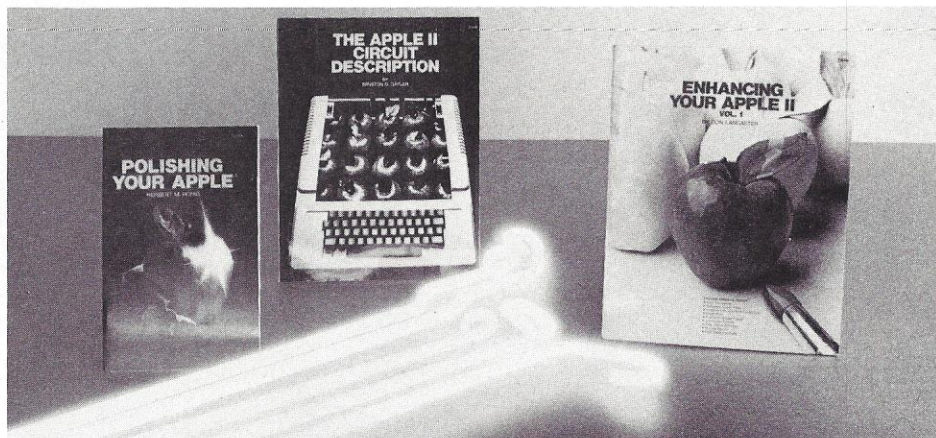
CHANGING ADDRESS?

If you’re planning to move, please let us know at least six weeks before changing your address. For fastest service, attach your current mailing label and fill in your name and new address in the space provided. This will insure accurate and prompt service on your subscription.

Name _____
New Address _____
City _____ State _____

Send old label with your name and new address to:

PERSONAL COMPUTING
P.O. Box 2942
Boulder, CO 80322



BRIGHT IDEAS TO HELP YOU USE THE APPLE II®



Sams sheds new light on the Apple II with these easy-to-understand books.

POLISHING YOUR APPLE shows you how to write, file and print programs with the Apple II. No. 22026, \$4.95.

THE APPLE II CIRCUIT DESCRIPTION provides a detailed circuit description of any Apple II motherboard, keyboard and power supply. No. 21959, \$22.95. (tentative).

INTERMEDIATE-LEVEL APPLE II HANDBOOK is a hands-on aid for exploring the entire internal firmware of the Apple II. No. 21889, \$16.95

ENHANCING YOUR APPLE II explains how to mix text, LORES and HIRES anywhere on the screen, and how to create 3-D graphics. No. 21846, \$15.95.

APPLE INTERFACING brings you tested interfacing circuits that work, plus the necessary BASIC software to connect the Apple II to the outside world. No. 21862, \$10.95.

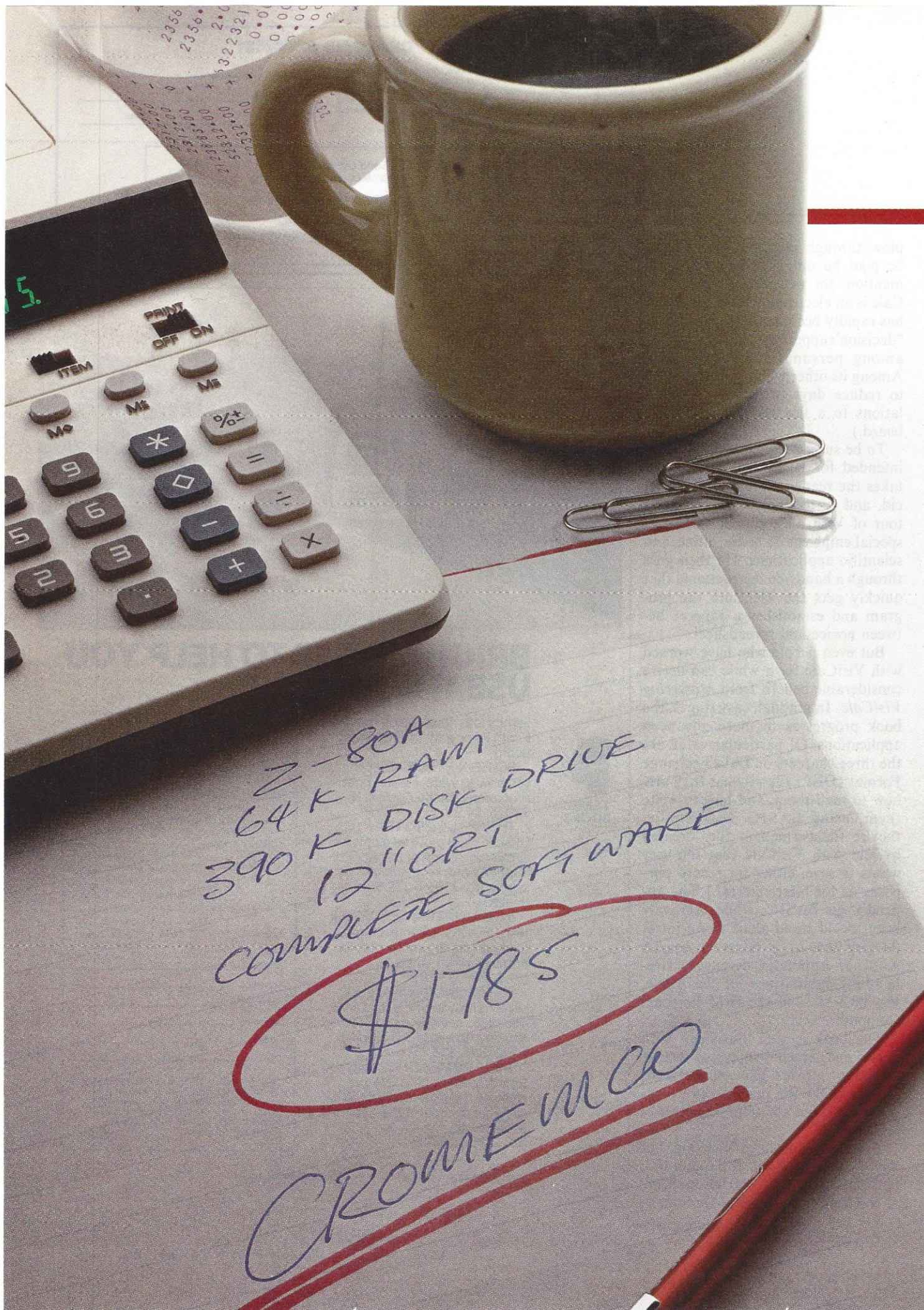
MAIL TO: Howard W. Sams & Co., Inc.
4300 West 62nd Street, P.O. Box 7092,
Indianapolis, IN 46206

	QUANTITY
POLISHING YOUR APPLE No. 22026, \$4.95	_____
THE APPLE II CIRCUIT DESCRIPTION No. 21959, \$22.95	_____
INTERMEDIATE-LEVEL APPLE II HANDBOOK No. 21889, \$16.95	_____
ENHANCING YOUR APPLE II No. 21846, \$15.95	_____
APPLE INTERFACING No. 21862, \$10.95	_____
Amount of Order	\$ _____
Add Handling Costs	\$ 2.00
Add Local Sales Tax Where Applicable	\$ _____
Total Amount of Order	\$ _____
Payment Enclosed: <input type="checkbox"/> Check <input type="checkbox"/> Money Order <input type="checkbox"/> VISA <input type="checkbox"/> MasterCard	
Account No. _____	
Expiration Date _____	
Name (print) _____	
Signature _____	
Address _____	
City _____ State _____ Zip _____	

Call toll-free 800-428-3696 or 317-298-5566 for the name of your local Sams Book outlet or to order by phone (give Sams Operator the code number in the box below). Offer good in USA only and expires 8/31/83. Prices subject to change without notice.

[AD329]

Apple & Apple II are registered trademarks of Apple Computer, Inc.



2-80A
64 K RAM
390 K DISK DRIVE
12" CRT
COMPLETE SOFTWARE

\$1785

CROMEMCO

How to buy a computer by the numbers.

Introducing the Cromemco C-10 Personal Computer. Only \$1785, including software, and you get more professional features and performance for the price than with any other personal computer on the market. We've got the numbers to prove it.

The C-10 starts with a high-resolution 12" CRT that displays 25 lines with a full 80 characters on each line. Inside is a high-speed Z-80A microprocessor and 64K bytes of on-board memory. Then there's a detached, easy-to-use keyboard and a 5¼" disk drive with an exceptionally large 390K capacity. That's the C-10, and you won't find another ready-to-use

personal computer that offers you more.

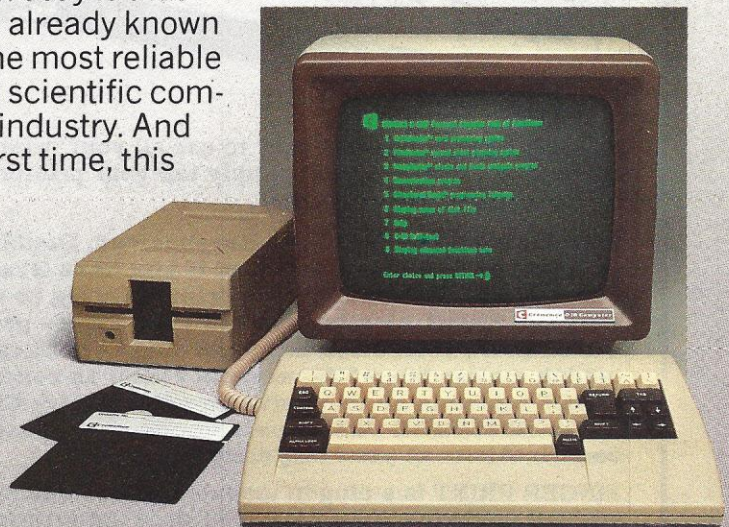
But hardware can't work alone. That's why every C-10 includes software—word processing, financial spread sheet, investment planning and BASIC. Hard-working, CP/M^R-based software that meets your everyday needs. Software that could cost over \$1000 somewhere else. FREE with the C-10. There's really nothing else to buy.

But the C-10's numbers tell only part of the story. What they don't say is that Cromemco is already known for some of the most reliable business and scientific computers in the industry. And now for the first time, this

technology is available in a personal computer.

One last number. Call **800 538-8157 x929** for the name of your nearest Cromemco dealer, or to request literature. In California call 800 672-3470 x929. Or write Cromemco, Inc., 280 Bernardo Avenue, P.O. Box 7400, Mountain View, CA 94039. In Europe, write Cromemco A/S, Vesterbrogade 1C, 1620 Copenhagen, Denmark.

CP/M^R is a registered trademark of Digital Research, Inc. All Cromemco products are serviced by TRW.



Cromemco
Tomorrow's computers today

CIRCLE 67

COMING IN FUTURE ISSUES

Video Game Buyer's Guide

Video game sales are bigger than ever, and so is the selection of games available. Games of adventure, fantasy, and action come in a wide range of skill levels, graphic sophistication, and price. See what's new in the video game market in our Buyer's Guide to Adventure Games in the June issue of *Personal Computing*.

INTRODUCING FINGER PRINT^{T.M.}

Gives you fingertip
control of your
Epson Printer!



FINGER PRINT makes it easy to use all your printer's capability. Once installed, simply tap your printer's panel buttons to instantly select:

Compressed, Double Wide, Emphasized, Double-Strike printing or combinations. And if you have Grafrax-Plus, you can add Italics and Fine Print printing to the list. FINGER PRINT also lets you call for 8 lines per inch, Automatic Perforation Skipover and Left Margin Indent (which makes bound documents easier to read). FINGER PRINT features an exclusive no-print Buffer-Clear, too. All in all FINGER PRINT puts hundreds of possible print combinations at your fingertips!

FINGER PRINT is a plug-in module that installs in minutes without soldering. FINGER PRINT does not interfere with normal printer operation. FINGER PRINT is compatible with all Epson MX80 and MX100 printers...and it works with all computers, software, and interfaces.

\$59.95 WARRANTED FOR ONE FULL YEAR!

Includes complete installation, operation instructions; control panel reference label.

Look for FINGER PRINT at your local computer dealer. For the dealer near you, or additional information, call (213) 969-2250. To order directly, call toll free: 800-835-2246, Ext. 441. MC/Visa and COD orders accepted (include \$1.50 s/h...CA residents add sales tax).

DRESSELHAUS COMPUTER PRODUCTS

We make technology easy to live with.

P.O. Box 929, Azusa, California 91702

BOOK REVIEWS

(continued from page 143)

it could be just what you're looking for. If you're planning to buy Visi-Calc, buy a copy of this book at the same time. By all means, read through the manual that comes with the software. Then set it aside for reference, load the program into your computer, and let Hergert be your guide.

—Marvin Grosswirth

When documentation isn't enough

OSBORNE CP/M USER GUIDE

THOM HOGAN
OSBORNE/MCGRAW-HILL
BERKELEY, CA
286 pp., \$15.95

Although CP/M has gone through several expansions, it is essentially the same system as the one developed in 1973 by Dr. Gary Kildall, who was, at that time, a software consultant for Intel, the microprocessor manufacturer. Intel declined to market the system, and this later led to the founding of Digital Research. Some estimates suggest that there are as many as a half-million CP/M users, and versions of the operating system are available for almost every personal computer in production today. So it comes as no surprise that Osborne has now published the second edition of Hogan's valuable user's guide.

While it is certainly true that the documentation offered with CP/M is extensive and often consists of six or more manuals, the CP/M novice will find the manuals tough going unless he is a relatively experienced programmer. Thus, a separate user's guide, such as Hogan's book, is a worthwhile purchase.

The book will also be of value to owners of computers not ordinarily sold with CP/M, such as the Apple II or the IBM Personal Computer.

COMING IN FUTURE ISSUES

Thinking Computers

As a researcher in artificial intelligence at Yale University, Natalie Dehn is trying to forecast the effects of the computer revolution on human thought processes. In an interview with *Personal Computing*, she discusses her work and offers her observations on how computers are changing the way people think.

With the addition of the Xedex Baby Blue card for the IBM, or the Microsoft Softcard for the Apple, the vast range of software that runs under CP/M comes into view. Hogan's book is an excellent introduction to CP/M that should be read before the purchase of add-on hardware and operating software.

In readable style, Hogan shows how the user can get started with CP/M, CP/M-80, and CP/M-86. He explains how to use both the built-in commands—those stored in memory when the operating system is booted—and the transient commands—those stored on disk and loaded into memory when called. A brief chapter also looks at assembly-language utilities, but this chapter will be of use only to experienced assembly-language programmers. An additional chapter is devoted to variations on CP/M such as MP/M and CP/NET.

—Jeffrey Bairstow

CP/M: For insiders only

MASTERING CP/M

ALAN R. MILLER
SYBEX, INC.
BERKELEY, CA
398 pp., \$15.95 paperback

While I would wholeheartedly recommend the *Osborne CP/M User Guide* to almost any new or current CP/M user, *Mastering CP/M* is strictly for the advanced user or systems programmer with a good background in assembly language. The author recommends a few introductory books on CP/M and assembly-language programming as a prerequisite for understanding his book. He's right. It's a guide for those who want to understand the inner workings of CP/M.

Alan Miller, a professor at the New Mexico Institute of Technology,

**You don't have to spend over \$5,000
for a personal computer . . .
You can own one for only \$2,995.**

**Magic Computer
offers so much more!**

- Dual Processors (Z80A & 6502)
- 64K user RAM and 3K Display Memory
- Dual 320KB Disk Drives
- 12 inch high resolution Monochrome Monitor
- Video Output, RS232C and Centronics port
- Keyboard with numeric pad
- Single Disk Version also available
- Dual Processor provides enhanced performance — comparable to systems costing more than twice the price
- Complete with a comprehensive set of software
- Choose only the printer you need to start using your system immediately
- CP/M based system lets you select special programs from many sources

You can believe it's



Software — CP/M Plus™ & CBasic® (Registered Trademark of Digital Research Inc.)
Perfect Writer™, Perfect Speller™, Perfect Filer™, and Perfect Calc™ (Trademarks of Perfect Software Systems Inc.)

For additional information, contact your local computer dealer or

MAGIC Computer Company, Inc.
2 Executive Drive
Fort Lee, NJ 07024
(201) 944-6700



See Us At

COMDEX/SPRING '83

April 26-29, 1983
Georgia World Congress Center and
The Atlanta Apparel Mart
Atlanta, Georgia
Booth 661



CIRCLE 69

BOOK REVIEWS

uses a tutorial style to cover procedures for altering the basic disk operating system (BDOS) and the basic input-output system (BIOS). He explains in some detail how to build a macro library and how to examine the CP/M disk directory. The book is full of assembly-language routines, and appendices detail the 8080 and Z80 microprocessor instruction sets.

—Jeffrey Bairstow

Facing up to interfacing

HARDWARE INTERFACING WITH THE TRS-80

JOHN E. UFFENBECK
PRENTICE-HALL, INC.
ENGLEWOOD CLIFFS, NJ
231 pp., \$19.95 hardbound;
\$13.95 paperback

The third sentence in *Hardware Interfacing with the TRS-80* reads: "Each experiment [in this book] is intended to be built on a breadboard and not constructed as a permanent circuit." In other words, John Uffenbeck issues an open invitation to would-be tinkerers with a propensity toward klutziness to dive in. Whatever calamities and disasters may occur during the experiments, at least the computer is likely to remain unharmed.

The book, however, is probably best suited for people who enjoy tinkering for its own sake, or who want certain peripherals but can't justify the expenditures for plug-it-in-and-watch-it-run hardware.

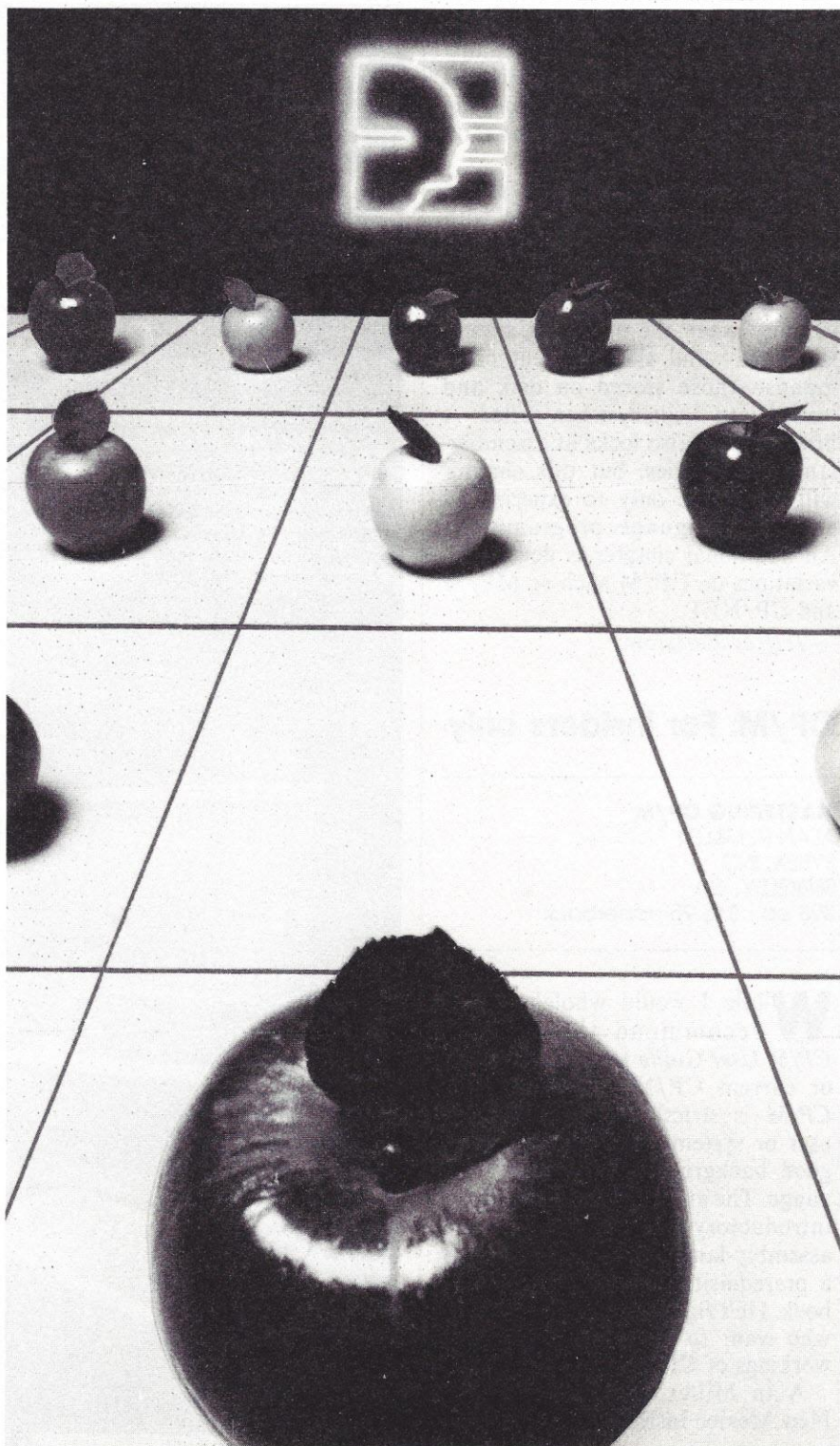
Among the 14 "practical hardware experiments" in this book are those that enable the experimenter to hook up a modem, a printer, a digital-to-analog converter and vice versa, a programmable sound generator, and a variety of other devices that Uffenbeck views with suspicion.

"Much of the outside world," he

COMING IN FUTURE ISSUES

Computer Typesetting By Telephone

Businesses can cut typesetting costs by transmitting material directly to the typesetter through a word processor and telephone modem. This method can reduce input costs and turnaround time while still providing the benefits of professional typesetting and printing. Read how to set up such a system in the June issue of *Personal Computing*.



Buyer's Guide To Computer Furniture

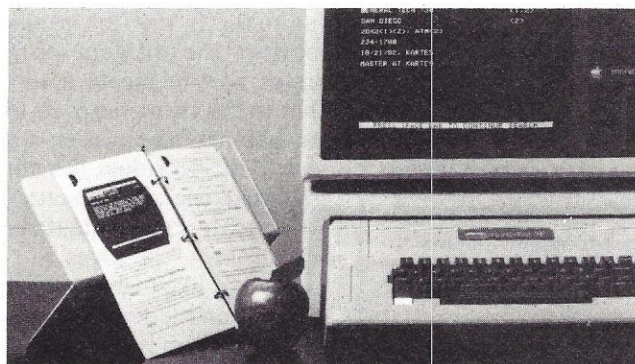
As technological advances bring us more sophisticated computers, computer furniture manufacturers are responding with innovative, ergonomically designed furniture to support and enhance the new hardware. For a full report on computer furniture, see the special Buyer's Guide in the September issue of *Personal Computing*.

GIVE YOUR APPLE® INSTANT RECALL™ FOR JUST \$59.95

Forget what you've heard about computer filing. INSTANT RECALL just made everything easy. No fields, no forms, no formats, no fooling. Nothing to set up before you get started. And, best of all, INSTANT RECALL comes at a no-kidding price of just \$59.95.

Save your notes about everything. Keep track of appointments and important dates. Record minutes of your meetings. Or reminders about customers conferences, expenses, or just about anything! You can mix up as many kinds of information as you want, or you can organize different files on different diskettes. Either way, INSTANT RECALL finds what you've filed the instant you ask, whether or not you remember what's there.

If you've got an Apple II® or Apple II Plus® with at least 48K, one disk drive and Applesoft in ROM, what are you waiting for? To find your nearest dealer or to order, call 800-428-3696 or 317-298-5566 and reference AD305. In Canada, contact Lenbrook Industries, Ltd., Scarborough, Ontario.



SAMS BOOKS AND SOFTWARE

Howard W. Sams & Co., Inc.
4300 West 62nd Street
P.O. Box 7092
Indianapolis, IN 46206

Instant Recall is a trademark of Howard W. Sams & Co., Inc.
Apple II and Apple II Plus are registered trademarks of Apple Computer, Inc.

BOOK REVIEWS

writes, "presents a 'hostile' environment to the TRS-80..." That hostility, apparently, can be tamed with experiments aimed at controlling 110-volt AC devices, and devices that require "handshaking" procedures.

It would appear that as technically oriented works go, this is not a particularly difficult book to comprehend. It is not, however, for the frivolous. Nor is it for those given to emotionalism. "It is surprising," writes Uffenbeck, "how many of yesterday's problems can be solved the next morning in five minutes with a cool head. When you find yourself getting agitated, take a break. Come back to the circuit later. More often than not, you will fix your problem in a few minutes."

—Marvin Grosswirth

But is it art?

COMPUTER ART AND ANIMATION FOR THE TRS-80

DAVID L. HEISERMAN
PRENTICE-HALL, INC.
ENGLEWOOD CLIFFS, NJ
246 pp., \$12.95 paperback;
\$17.95 hardbound

"Viewed objectively," David Heiserman tells us, "a TRS-80 image of a girl standing in the middle of the screen can look terrible. However, if you take time and care in preparing the figure... the brain will attempt to interpret the image as something rather nice and meaningful.... Furthermore, the effect is enhanced when the image is animated in real time."

Well, I certainly hope so.

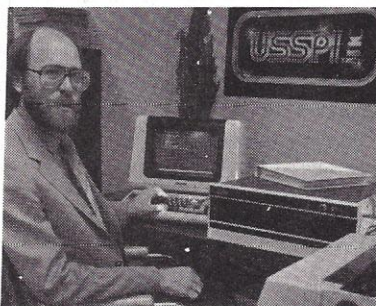
The rather skimpy illustrations of the actual results of programming for "art" and animation that appear in this book are not terribly impressive. Perhaps the problem is in the book's title. Computer art conjures up lush images of intertwining swirls and loops and peaks, of fanciful forests, of

COMING IN FUTURE ISSUES

Can Two Computers Live As Cheaply As One?

As members of the family compete for time on the home computer, many people are considering buying a second computer for home use. What should you look for in a second computer? Can two computers share peripherals? Software? Find out in the July issue of *Personal Computing*.

PROFITS SILKY SMOOTH WITH MicroAge[®] SOLUTION



PROBLEM:

"Our company US Screen Print Industries Inc. purchased what we were told was a state-of-the-art multi-user, computerized accounting system. Unfortunately, the computer couldn't perform the tasks we wanted...and the company we bought it from gave us no after-sales support."

SOLUTION:

"Then, we went to MicroAge for the computer solution we needed, they knew exactly what questions to ask because of their prior experience with "multi-user computer solutions for business."

"MicroAge recommended an Altos multi-user computer system. We were so impressed with their understanding of our business and their ability to demonstrate the accounting functions...we purchased an Altos system the same day."

"MicroAge installed our system and trained eight of our employees on accounts receivable, inventory and sales order entry. And best of all, the Altos multi-user system was within our budget."

"Because of MicroAge, we expect to increase our cash flow by controlling receivables, keeping our inventory lower, making our customer shipments faster...all without increasing our staff."

"For our \$25,000 investment...we expect our Altos computer system to save us about \$100,000 next year. MicroAge...we should have gone to them first, they had the right solution for us."

Scott O. Fresener

Scott Fresener
US Screen Print Industries Inc.
Tempe, Arizona

MicroAge is creating success stories like this all across America, installing Altos and other cost effective commercial computer systems. Come to MicroAge, the "Solution Store" when your business is ready to computerize.

For the MicroAge Computer Store nearest you call:

1-800-525-4516

FRANCHISE OPPORTUNITIES AVAILABLE

MicroAge[®]
COMPUTER STORE
"The Solution Store"

BOOK REVIEWS

bagel shapes that glow—an orgy of plane and solid geometry. What we have here are a lot of nice arrangements of rectangles.

If this book were entitled "Computer Graphics and Animation with the TRS-80," it would not only be closer to the mark, but would fulfill the promise inherent in any book title.

As might be expected, the book begins with simple figures and winds up with more complex designs performing animated actions. Complete instructions on how to program are accompanied by sample programs that, presumably, produce the desired results. (They were not actually tested by me.)

Particularly interesting are the instructions on how to create unusual alphanumeric, which the author demonstrates with an eye-catching Cyrillic-alphabet set. (Whether "eye-catching" is synonymous with "attractive" is a matter of taste. I like it, but who knows what the Russians think of it?) You can do a CRT version of dropouts (white letters on a black background), letters of varying sizes, and whatever else your imagination conjures up.

As for the animation, if the figures are less than "art," they are certainly fun to do. In the first section on animation, the diligent programmer learns how to create a robot figure that walks, turns, raises its arm, turns its back to the screen and walks away, etc. Nor does the author suggest that one should settle for that: "...create some animated scenarios of your own," he urges.

If you'd like to draw some passable pictures and letters on your TRS-80, and have them move about, this book will show you how to accomplish that and how to invent your own graphics and animation sequences. They should look quite good. They should also provide an effective prod for your own creativity.

But is it art?

—Marvin Grosswirth

Can a computer purchase be this difficult?

SO YOU THINK YOU NEED YOUR OWN BUSINESS COMPUTER

WILLIAM E. PERRY
JOHN WILEY & SONS, INC.
NEW YORK, NY
201 pp., \$14.95

After reading this book, you'll probably come to the conclusion that the last thing your business needs is a personal computer. If buying a computer were as difficult as this book suggests, most small businessmen would never get to the buying stage. William Perry, a computer consultant, seems to be making a strong case for hiring consultants to examine businesses and make recommendations on computer applications. Perry may be entitled to publicize his services, but I don't see why anyone should pay \$14.95 to read his advertisement.

Perry is thorough, however. His book is full of worksheets, some of which have 40 or 50 items that need to be filled out. He then directs the reader to several step-by-step procedures and a variety of not so trivial tasks. It's enough to bring an already overworked small businessman to his knees. I realize that a \$6000 investment is not to be considered lightly by anyone, but is \$12,000 worth of effort really necessary before making that investment?

Fortunately, there are little gems scattered throughout the book that may make the completion of the those worksheets superfluous. Called "Rules of Thumb" by the author, these platitudes may tell businessmen all they need to know.

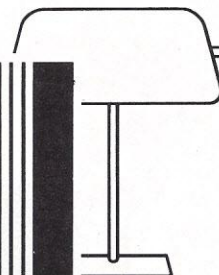
Few small businessmen will have the resources to tackle the planning indicated in Perry's book. Fewer small businessmen will have the time needed to read this book.

—Jeffrey Bairstow



INTRODUCING BABY TEX™

THE "PLUG IN" ANSWER TO SOFTWARE
FOR THE NEW TI PROFESSIONAL COMPUTER



SOFTWARE SELECTION: BABY TEX™ upgrades your TI Professional Computer and allows you to run nearly 3000 popular CPM® software programs.

SOFTWARE VERSATILITY: The BABY TEX™ package includes three special "utility" software programs at no additional cost, making your computer more versatile.

SOFTWARE SAVINGS: BABY TEX™ is now available bundled with WordStar™, MailMerge™, Personal Pearl™ and WonderCalc™ for only \$995. That's four applications programs plus BABY TEX™ for only \$995.

ADDITIONAL MEMORY: BABY TEX™ gives your computer 64K of additional main memory.

If you are looking for software . . . BABY TEX™ is the answer!

Buy BABY TEX™ at your Authorized Texas Instruments Dealer.



Microlog, Inc.
222 Route 59, Suffern, NY 10901
(914) 368-0353

Microlog is a subsidiary of
Terminals Unlimited International, Inc.
Dallas, TX (NASDAQ: TUII)

BABY TEX is a trademark of Microlog, Inc.
WordStar and MailMerge are trademarks of MicroPro International Corporation.
Personal Pearl is a trademark of Relational Systems International Corporation.
CPM is a registered trademark of Digital Research Incorporated.

CIRCLE 75

Score high on the GRE... HBJ Computer GRE™

The COMPUTER GRE™ system has been designed to prepare undergraduate students for the all-important Graduate Record Examination using a total educational approach that encompasses interactive software and a successful textbook.

The COMPUTER GRE™

Package contains:

- 3 double-sided diskettes with Graphics Displays
- HBJ's popular text, "How to Prepare for the GRE"
- A totally understandable, "user-friendly" User's Manual

COMPUTER GRE goes beyond mere drill and practice. The program provides:

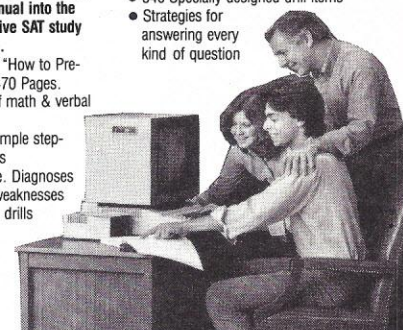
- 4 Complete Practice Tests
- Immediate Scoring
- GRE-Comparable Test Timing
- Individualized Item Diagnosis
- Personalized Prescriptions for remediation of weaknesses
- Original on-Screen Drill Items in 18 key categories
- Explanatory Strategies
- 1000 Electronic Vocabulary Flashcards

HBJ Computer SAT™

Combines Software, Review Textbook & User's Manual into the Most Comprehensive SAT study program available.

- Complete textbook "How to Prepare for the SAT" 470 Pages. Complete review of math & verbal categories
- User's Manual—simple step-by-step instructions
- Computer Software. Diagnoses your strengths & weaknesses
- Prescribes Specific drills
- Scores & Times

- 1000 Electronic Vocabulary & building Flash Cards
- 540 Specially designed drill items
- Strategies for answering every kind of question



Harcourt Brace Jovanovich, Inc.

Dept. Computer SAT: 1250 6th Avenue
San Diego, CA 92101

FOR CREDIT CARD ORDERS CALL TOLL-FREE
800-543-1918 (In California call collect (619) 699-6335)

Please send me _____ Computer GRE **\$79⁹⁵**

Quantity _____
for my ☐ 48K Apple II or Apple II Plus or Apple IIe

Please send me _____ Computer SAT **\$69⁹⁵**

Quantity _____
for my ☐ 48K Apple II or Apple II Plus or Apple IIe or ☐ TRS-80 Model III or ☐ IBM PC

Please add \$2.00 for handling (UPS delivery guaranteed). Please add applicable state and local sales tax. (Institutions must send purchase order to be billed.) Offer restricted to Continental USA and Canada.

Method of Payment: ☐ Check ☐ Money Order
Charge My: ☐ Visa ☐ MasterCard ☐ American Express

Acct. # _____ Exp. _____

Signature _____

Name _____

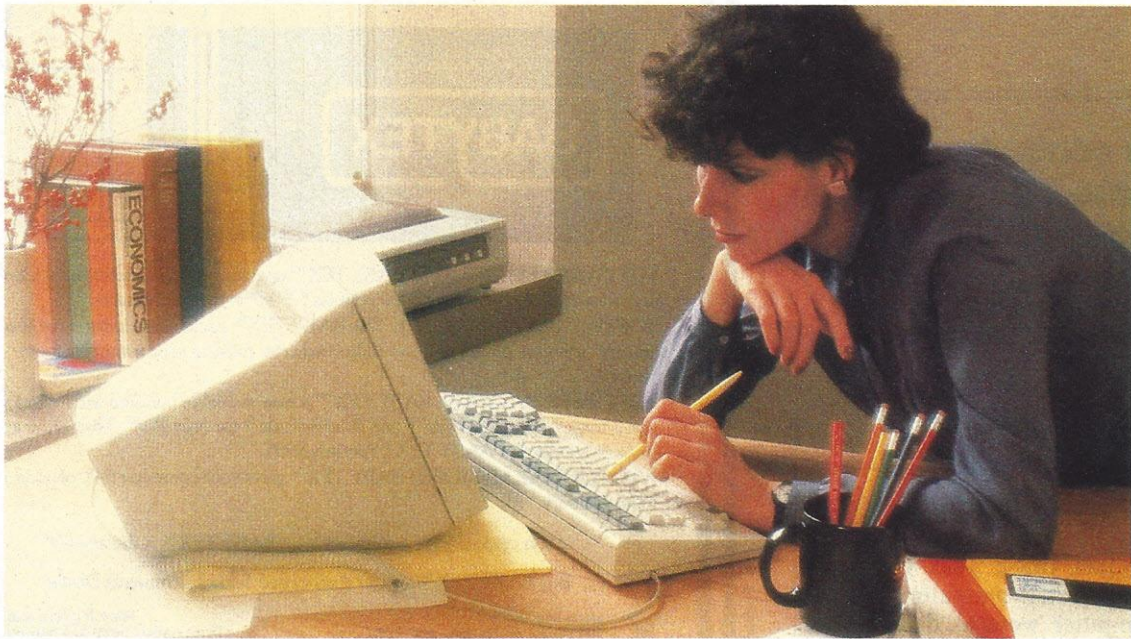
Address _____

City _____ State _____ Zip _____

Please send more information:

☐ The Atari Computer SAT **PC-583**

CIRCLE 76



**A COMPANY THAT
CAN'T STAND BEHIND
ITS PERSONAL
COMPUTERS
SHOULDN'T ASK
YOU TO SIT IN
FRONT OF ONE.**

The plain truth about personal computers is this: most companies have a fairly shallow commitment to service.

Yet one company, Digital Equipment Corporation, has a service program so well thought-out, it overshadows all others in the industry.

For example, Digital is the only company to offer a 90-day warranty on both hardware *and* software. We provide a toll-free hotline, manned by personal computer specialists, who will answer any questions. We even put service *inside* our personal computers.

Turn one on and it tests itself. Automatically. If there's ever a problem, the computer will tell you *exactly* what it is.

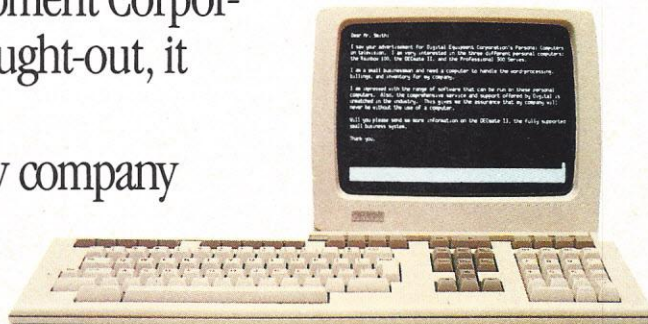
Then, you've got three *convenient* ways to get it fixed. Call in one of Digital's service professionals; bring your personal computer into one of our 160 carry-in service centers; or order a replacement module yourself through our DECmailer service.

We went to a lot of trouble to provide all this service. And the irony is, you probably won't need it.

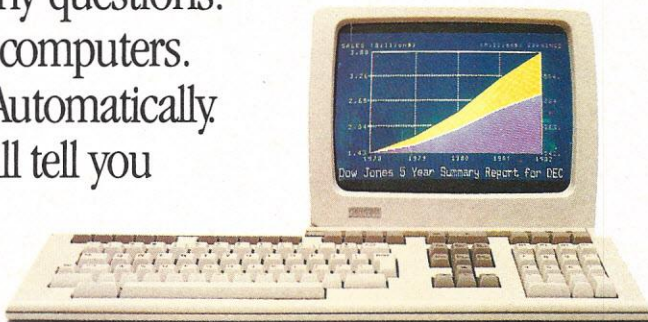
Because we also took the trouble to design our personal computers right in the first place.

For a brochure on our three personal computers, call 1-800-DIGITAL. Or write:

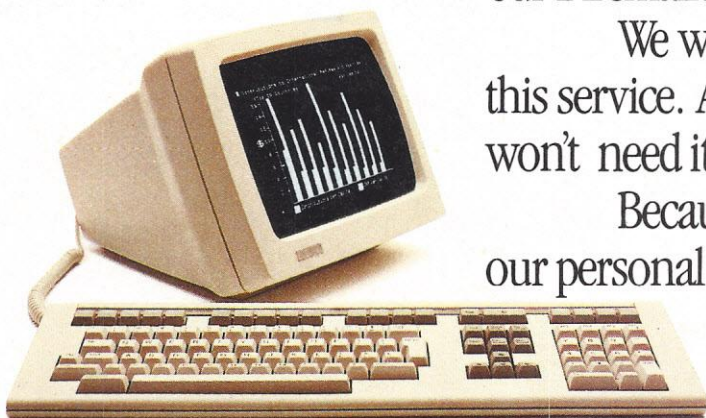
Digital Equipment Corporation, 200 Baker Avenue, Concord, MA 01742.



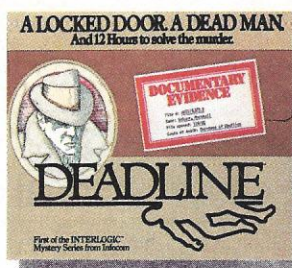
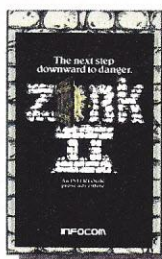
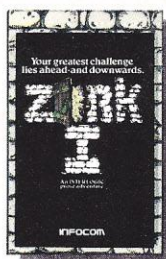
DECmate II The fully supported office and small business system.



PROFESSIONAL 300 SERIES The minicomputer of personal computers.



RAINBOW 100 The low-cost, high-performance machine.



WE'RE WRITING

THEM AS FAST AS WE CAN!

At the rate we're going, we'll have these pages filled by 2083. And by 2084, people will be clamoring for the next Infocom creation.

We hate to disappoint our public. So we keep you waiting. Because while the software factories are cranking out arcade game after arcade game, pulpy adventure after trite fantasy, we're writing and rewriting, honing and perfecting. Before a single person enters one of Infocom's worlds, it must be crafted into a living, riveting, definitive experience.

Judging from the public's reaction, it's worth the wait. For instance, *Creative Computing* welcomed DEADLINE™ as "thoroughly engrossing and realistic," while a *Softalk* readers' poll recently voted ZORK™ I and ZORK II the most popular adventures of 1981.

And now, for the moment, your wait is over. ZORK III, your final

step in the underground trilogy, and STARCROSS™, an exploration of a new dimension in science fiction, are ready for you.

Look at them up there, the little worlds of Infocom. As our universe expands, companions will come to help fill that vast expanse of white space. Till then, they'll continue to stand alone as the best of all possible worlds.

INFOCOM™

55 Wheeler Street, Cambridge, MA 02138

Infocom's worlds are available for Apple®, Atari®, IBM, TRS-80®, Commodore, NEC, Osborne, CP/M®, and DEC.™

Apple is a registered trademark of Apple Computer, Inc. Atari is a registered trademark of Atari, Inc. TRS-80 is a registered trademark of Tandy Corporation. CP/M is a registered trademark of Digital Research, Inc. DEC is a trademark of Digital Equipment Corporation.

PERSONAL COMPUTING DEALERS

Many of the products and services listed in *Personal Computing* are available from the dealers listed here. This listing is in area-code order for easy reference. Retailers: If you would like to become a *Personal Computing* dealer, please call Merri Hollander, (201) 843-0550, ext. 313 for information.

ALASKA

Empire Electronic/Anchorage (206) 244-5200
Electronics Supply Center Inc./Anchorage (907) 277-2142
Juneau Electrics/Juneau (907) 586-2260
Software Unlimited/Anchorage (907) 279-5378

ALABAMA

Anderson Computers/Huntsville (205) 539-3444
Computerland/Anniston (205) 237-5600
Madison Books (205) 772-9250
Olensky Brothers/Mobile (205) 344-7448
The Byte Shop/Huntsville (205) 534-4189
The Computer House/Andalusia (205) 222-7753
University Supply Store/Tuscaloosa (205) 348-6168

ARKANSAS

The Computer Company/Pine Bluff (501) 534-9599
Computerland of Fort Smith (501) 452-8860
Computerland of Fayetteville (501) 442-9441
Vaughn Electronics Corp./Rogers (501) 636-2343

ARIZONA

Computer Depot/Prescott (602) 778-7473
Computer Superstore/Phoenix (602) 957-6780
Computerland/Tucson (602) 297-7023
The Computer Store/Phoenix (602) 866-0258
Dataplace/Tempe (602) 839-0888
Dataplace/Phoenix (602) 266-6111
Desert News/Tucson (602) 747-0428
Food for Thought/Tucson (602) 327-9481
Heathkit Electric Center/Phoenix (602) 279-6247
International Computer Stores/Phoenix (602) 864-0037
Metro Computer Store/Tucson (602) 323-3116
Personal Computer Place/Mesa (602) 833-8949
The Xerox Store/Mesa (602) 898-9304
The Xerox Store/Phoenix (602) 861-3256

CALIFORNIA

Computerland of Fresno (209) 224-8200
Computerland/Stockton (209) 473-1241
Computerland/Visalia (209) 739-1033
Computers Etc./Stockton (209) 957-9500
Electric Brain/Fresno (209) 227-8479
Harding Way News/Stockton (209) 464-7514
Sunrise Computer Products/Merced (209) 383-9026
A-Vide Electrics, Co./Long Beach (213) 598-0444
The Beverly Hills Computer Store (213) 276-6100
Compumart/Santa Monica (213) 829-3623
Computer Business Center/Santa Monica (213) 452-2027
Computer Champ/West Covina (213) 960-9844
Computer Forum/Santa Fe Springs (213) 921-2111
Computer Seen/Long Beach (213) 438-7469
Computer Store/Santa Monica (213) 451-0713
Computerland/Burbank (213) 213-7162
Computerland/Lawndale (213) 371-4624
Computerland/Glendale (213) 246-2453
Computerland/Pasadena (213) 449-3205
Computerland/San Fernando (213) 716-7714
Computerland/Torrance (213) 543-2221
Computerland/West Covina (213) 960-6351
The Floppi Disk/Downey (213) 862-1888
Fryst Byte/Whittier (213) 947-9411
HW Computers/Northridge (213) 886-9200
HW Computers (213) 370-5556
Levity Distributors/N. Hollywood (213) 982-2514
Love Computers/Arcadia (213) 447-0721
O Pamp Technical Books/Los Angeles (213) 464-4322
Personal Power/Canoga Park (213) 703-7921
Programs Unlimited/Studio City (213) 349-0300
Rainbow Computing/Northridge (213) 346-8353
Sandy's Electrics/Canoga Park (213) 345-9000
Soft Byte/Tarzana (213) 793-4443
Software Centre International/Pasadena (213) 378-9225
Software Centre International/Torrance (213) 793-4101
Software Central/Pasadena (213) 702-8918
Software Etc./Woodland Hills (213) 473-1136
Software Store/Los Angeles (213) 705-4445
The Software Source/Encino (213) 451-8089
Unicom, Inc./Tarzana (213) 907-1415
The Xerox Store/Encino (213) 793-0228
The Xerox Store/Pasadena (213) 451-0866
The Xerox Store/Santa Monica (213) 316-5163
Advanced Computer Prods./San Jose (408) 946-7010
Affordable Computer Sys./Santa Clara (408) 249-4221
Businessland/San Jose (408) 554-9292
Computerland/San Jose (408) 267-2182
Computerland/Santa Clara (408) 246-4500
Computerland (408) 253-8080
Computerland (408) 988-1413
Computer Literacy/Sunnyvale (408) 730-9955
Computer Plus/Sunnyvale (408) 735-1199
Computer Works/Cupertino (408) 257-7863
Peninsula Computer Ctr./Salinas (408) 424-2103
Quement Electrics/San Jose (408) 998-5900
The Software Depot/Sunnyvale (408) 270-0450
Software Centre Int'l/Sunnyvale (408) 730-9494
Software Centre Int'l/Sunnyvale (408) 727-1555
Software Centre International/Oakland (408) 248-9000
The Xerox Store/San Jose (408) 372-4222
The Xerox Store/Sunnyvale (408) 375-3144
Zackit Monterey (415) 676-3533

Businessland/Los Altos (415) 968-9062
Businessland/San Mateo (415) 340-9111
Computer Age Co./San Mateo (415) 348-2667
Computer Center (415) 845-6366
Computer Post/Newark (415) 790-0410
Computerland (415) 794-9311
Computerland/EI Cerrito (415) 527-8844
Computerland/Los Altos (415) 941-8154
Computerland/San Francisco/Van Ness (415) 583-4414
Computerland/Walnut Creek (415) 935-6502
Computerland of the Castro (415) 864-8080
Friendly Software/San Carlos (415) 593-8275
Infosoft Systems/Concord (415) 680-0324
Keplers' Books/Los Altos (415) 948-5666
Micro Age Computer Store (415) 680-1489
Micro Age Computer Store (415) 964-7063
Micro Age Computer Store/Mt. View (415) 786-5264
Micro Age Computer Store/Pleasant Hill (415) 828-7884
Micro Tutor/Danville (415) 926-9689
Mission Computer Center/Palo Alto (415) 326-6657
P C Computers/EI Cerrito (415) 527-6500
Printers (415) 524-7300
Roboket/EI Cerrito (415) 965-1735
Skyles Electric Works/Mountain View (415) 674-0222
Software Centre International/Concord (415) 941-8788
Software Emporium/Los Altos (415) 483-9862
Sorbus Station/San Leandro (415) 340-7115
The Software Shop/Burlingame (415) 326-0681
Stacey's Bookstore/San Francisco (415) 665-7378
Sunset Computers/San Francisco (415) 524-8934
Technika Berkeley (415) 680-1600
The Xerox Store/Concord (415) 324-8200
The Xerox Store/Palo Alto (415) 324-8200
Palomar Computer Products/San Marcos (619) 744-7314

Software Centre/La Mesa (619) 462-3900
Computer Scene (707) 462-1578
Santa Rosa Computer Ctr. (707) 528-6480
Zackit Vallejo (707) 644-6676
Advanced Computer Prods./Santa Ana (714) 558-8813
Byte Shop/San Diego (714) 565-8008
Capistrano Computers (714) 661-7250
Computer Age/San Diego (714) 565-4042
Computer Merchant/San Diego (714) 583-3963
Computer Metrics/EI Cajon (714) 579-8066
Computer Nook, Inc./San Bernardino (714) 381-3446
Computerland (714) 464-5656
Computerland/Laguna Hills (714) 560-9912
Computerland/North (714) 859-8912
Computerland/San Bernardino (714) 434-3300
Computerland/W. Los Angeles (714) 886-6838
Computerland/Riverside (714) 560-9912
Computers Unlimited/Dana Point (714) 686-3470
Computer Wave Inc./Westminster (714) 661-8062
Consumer Computers (714) 891-2584
CTC—The Computer People (714) 465-8888
HBJ Bookstore/San Diego (714) 565-0505
Heathkit Electro Center (714) 238-1255
Idea Computers (714) 776-9420
Integrated Circuits Unitd./San Diego (714) 278-4393
James Games Computer Center (714) 985-3278
Max Company/Costa Mesa (714) 546-9321
Net Profit Computers/Anaheim (714) 750-7318
Powers Computer Center/Anaheim (714) 778-6021
Practical Computing/Encinitas (714) 436-3512
Software Centre Int'l/EI Toro (714) 642-6836
Software Centre Int'l/Brea (714) 576-1424
Software Centre Int'l/Huntington Beach (714) 842-1990
Software Centre International/San Diego (714) 576-1424
Software Centre/Santa Ana (714) 641-0332
Sorbus Station/Anaheim (714) 549-8505
The Computer Merchant/Escondido (714) 583-3963
The Wabash Apple/EI Toro (714) 768-3236
The Xerox Store/Brea (714) 671-0794
The Xerox Store/Costa Mesa (714) 646-8941
The Xerox Store/Costa Mesa (714) 641-9099
The Xerox Store/Huntington Beach (714) 898-8066
The Xerox Store/Riverside (714) 687-2580
The Xerox Store/San Bernardino (714) 889-9511
The Xerox Store/Long Beach (714) 889-9511
VIP Computer Centers/Irvine (714) 551-5622
Byte Shop/Ventura (805) 647-8945
Charlie Apple Software/Ventura (805) 644-0799
Compupup/Lancaster (805) 942-5747
Computer Horizons/Camarillo (805) 987-4330
Computer Plaza/Santa Barbara (805) 687-9391
Computer Shop (805) 963-1325
Computer Solutions/Santa Monica (805) 922-6639
Computer Sound/Lancaster (805) 945-5921
Computerland/San Luis Obispo (805) 541-4884
Computerland Santa Clarita/Newhall (805) 254-3121
Computerland of Santa Barbara (805) 967-0413
Computerland/Thousand Oaks (805) 495-3554
Computerland Ventura (805) 396-8084
QPSB Personal Electrics/Goleta (805) 967-7100
Ventura County Computer Center (805) 648-5059
Byte Shop/Sacramento (916) 961-2983
Capitol Computer/Sacramento (916) 483-4729
Computer Place/Redding (916) 221-1312
Computerland/Redding (916) 241-7922
Computerland/Sacramento (916) 920-8981
Computertime/Citrus Heights (916) 969-4111
House of Computers/Sacramento (916) 971-9642
Software Centre Int'l/Sacramento (916) 925-3337
Student Bookstore/Cal State U. (916) 895-6044

COLORADO

1 Stop Software Stores/Arvada (303) 431-6598
Aparat/Denver (303) 741-1778
Computer Connection/Englewood (303) 740-9360
Computer Connection/Boulder (303) 449-8282
Computer Shack/Pueblo (303) 564-3545
Computerland/Durango (303) 385-4848

Computers, Inc./Englewood (303) 779-5256
The Xerox Store/Aurora (303) 695-8660
The Xerox Store/Denver (303) 825-2386
The Xerox Store/Denver (303) 692-0414
Whole Life Distributor/Denver (303) 861-2825

CONNECTICUT

Aetna Life Club Store/Hartford (203) 273-3058
Anchor Microsystems/Westport (203) 222-1259
Bright Ideas/Gilford (203) 453-6665
Business Machine Center/Middletown (203) 632-1939
Computer Ease/Milford (203) 877-7447
Computer Services/Danbury (203) 743-1299
Computer Store (203) 563-9000
Computer Store (203) 627-0188
Computerland (203) 235-9204
Computerland/New Haven (203) 273-4807
"80" Plus Microcomputers/Seymour (203) 888-0170
Exel Sys./Stamford (203) 348-5894
Harold's Drugs/Bristol (203) 583-1854
Harty Electrics/New Haven (203) 787-5921
Heathkit Electronics/Avon (203) 678-0323
Logical Systems Inc./Farmington (203) 677-4557
Micro Age Computer Store/Greenwich (203) 629-8171
Micro Computer Store/Norwalk (203) 847-8428
Paperback Booksmith/E. Hartford (203) 568-2228
Rainbow Computer, Inc./New Haven (203) 777-2001
Southern New England Electronics/E. Windsor (203) 623-7635
Technology Sys./Bethel (203) 748-6856
The Computer Establishment/Old Saybrook (203) 767-8520
The Xerox Store/Hartford (203) 233-9871
Total Computers, Inc./Meriden (203) 634-0052
Yale Co-op/New Haven (203) 772-2200

DELAWARE

Computerland/New Castle/Newark (302) 738-9656
Computer Store/Wilmington (302) 478-7772
Micro Products/Wilmington (302) 762-0227
The Smoke Shop/Wilmington (302) 655-2861

DISTRICT OF COLUMBIA

Computer Store (202) 272-0294
Pentagon Book Stores (202) 695-0870
Program Store (202) 337-4693
Students Book Co. (202) 223-3327

FLORIDA

Evans Business Computer Sys (209) 576-0451
Advantage With Computers/W. Palm Beach (305) 471-1753
A I Personal Computer/Longwood (305) 339-8914
Allstate Business Center Ltd./Miami (305) 665-1013
Byte Shop of Miami (305) 264-2983
Clarks Out of Town News/Ft. Lauderdale (305) 467-1543
Computer Design/Hollywood (305) 983-2300
Computer Generation/Plantation (305) 791-4578
Computer Scene/Miami (305) 945-1014
Computer Scene/N. Miami Beach (305) 238-7238
Computerland/Altamonte Springs (305) 862-6202
Computerland/Boca Raton (305) 368-1122
Computerland/W. Palm Beach (305) 684-3338
Computerland of Jacksonville at Regency Ct. (305) 368-1122
Electronic Equipment Co./Miami (305) 871-3500
Get Computerized Inc./Titusville (305) 268-4007
H.I.S. Computeration/Melbourne (305) 254-9399
Independent Computer Systems/Winter Park (305) 629-4771
Lighthouse Book Store/Lighthouse Pt. (305) 781-1945
Micro Age Computer Store/W. Palm Beach (305) 683-5779
Programs Unlimited/W. Palm Beach (305) 689-1200
Software Centrum/Coral Gables (305) 441-2983
Sunnys At Sunset, Inc./Sunrise (305) 741-2070
The Xerox Store/Altamonte Springs (305) 831-3100
The Xerox Store/Ft. Lauderdale (305) 524-4663
The Xerox Store/Miami (305) 667-5441
The Xerox Store/N. Miami Beach (305) 947-9346
The Xerox Store/Orlando (305) 898-5000
Extra Extra Newstand/Tampa (813) 886-1802
Micro Computer System Inc. (813) 879-4301
The Xerox Store/Clearwater (813) 796-7507
The Xerox Store/Tampa (813) 977-8301
The Xerox Store/Tampa (813) 876-7439
Computer Sys. Resource (904) 376-4276
Computerland/Jacksonville (904) 731-2471
Computerland/Tallahassee (904) 224-9341
Florida Book Store/Gainesville (904) 376-6066
Goerings Book Ctr./Gainesville (904) 378-0363
Micro Electrics, Inc./Pensacola (904) 790-5771
Peachtree Computer Center/Atlanta (404) 522-0082
Panama City (904) 785-6441
Vitech/Tallahassee (904) 893-1743
Software Source, Inc./Tampa To come

GEORGIA

AIS Computer Store/Fayetteville (404) 461-3881
Atlanta Computer Mart/Atlanta (404) 455-0647
Atlanta Micro (404) 233-6942
Baileys Computer Shop (404) 790-5771
Computers Plus Inc./Atlanta (404) 237-7787
Computerland/Atlanta/Smyrna (404) 953-0406
Guild News Agency/Atlanta (404) 252-4166
Micro Graphics Systems, Inc./Augusta (404) 790-5771
Peachtree Computer Center/Atlanta (404) 522-0082
Programs Unlimited/Atlanta To come
Software Atlanta Ltd./Atlanta (404) 434-4171
Sorbus Station/Doraville (404) 458-0620
The Xerox Store/Atlanta (404) 938-1276
The Xerox Store/Atlanta (404) 233-9025
Electronics 21 Inc./Savannah (912) 352-0585
Ocean Software/Jesup (912) 427-4278

COMING IN FUTURE ISSUES

Getting Time On Your Side

A time-management program can be a valuable tool for the manager or executive with an active schedule. Time-management packages for use on personal computers can help the user set priorities, schedule (and keep) appointments, and coordinate the activities of department personnel. Find out what packages are available and what they can do for you in the June issue of *Personal Computing*.

HAWAII	
Amtec Inc./Honolulu	(808) 955-7429
Computer Center/Pearl City	(808) 448-2171
Computerland/Hawaii/Honolulu	(808) 521-8002
The Computer Store/Hilo	(808) 969-1166
IDAHO	
Electronic Specialties/Boise	(208) 376-5040
Magnum Computer/Boise	(208) 342-7304
ILLINOIS	
Computerland/Champaign	(217) 359-0895
Computerland of Springfield	(217) 522-3791
Main Street Computer Company/Mattoon	(217) 234-4404
Programs Unlimited/Schaumburg	To come
Computer-Ease/Macomb	(309) 833-3886
Computerland/McLean County	(309) 663-9571
Computer Terminal/Peoria	(309) 692-9100
TZ Computers/Bloomington	(309) 829-6806
Wallace Micro-Mart Inc./Peoria	(309) 685-7876
ABC Byte Shop/Skokie	(312) 673-3550
ABC Data Processing Corp/Oak Brook	(312) 986-5558
Book Market/Chicago	(312) 440-4475
Chicago Downtown Computerland	(312) 782-7180
Complete Computing/Lombard	(312) 620-0808
Computeshop/Rolling Meadows	(312) 593-1800
Computer Emporium/Naperville	(312) 369-3711
Computer Plus/Northridge	(312) 452-0066
Computer Store/La Grange	(312) 352-9488
The Computer Store/Oaklawn	(312) 499-1300
The Computer Store/Woodridge	(312) 985-8610
Computerland/Naperville	(312) 369-3511
Computerland/Niles	(312) 967-1714
Computerland/Northbrook	(312) 272-4703
Computerland/Oak Lawn	(312) 422-8080
Computerland/Oak Park	(312) 383-1606
Computerland/Schaumburg	(312) 253-3009
Computerland of St. Charles	(312) 377-7200
Data Domain/Schaumburg	(312) 397-8700
Erickson Communication/Chicago	(312) 631-5181
Future Computer Ltd./Forest Park	(312) 771-5850
Illini Microcomputer/Naperville	(312) 420-8813
Kroch's & Brentano's/All stores	(312) 332-7500
Micro Computer Ctr./Geneva	(312) 232-1545
Nabih's Inc./Evanston	(312) 869-6140
Northbrook Computers	(312) 480-9190
Oak Brook Computer Ctr.	(312) 941-9005
Page One/Roselle	(312) 529-9060
Prairie News Agency/Chicago	(312) 384-5350
Programs Unlimited/Schaumburg	(312) To Come
The Software Store/Glenview	(312) 724-7730
The Software Emporium, Ltd./Chicago	(312) To come
Sorbus Station/Bensenville	(312) 459-8560
Wine Micro Computers	(312) 420-8813
Univ. Bookstore/Carbondale	(618) 536-3321
Appletree Computer/DeKalb	(815) 758-8666
Computerland/Joliet	(815) 741-3303
Computerland/Mundelein	(815) 459-3892
Computer Store/Rockford	(815) 962-7580
Ideal Computer Systems/Kankakee	(815) 935-8505
INDIANA	
Computer Corner/Ft Wayne	(219) 749-8338
Computer Plus/Dyer	(219) 745-3330
Computerland/Ft. Wayne	(219) 483-8107
Computerland/Mirabel	(219) 769-8020
Computerland/Mishawaka	(219) 256-5688
Data Base/Ft. Wayne	(219) 484-3164
Fourway Computer Products/South Bend	(219) 277-7720
A Computer Store/Indianapolis	(317) 898-0331
Computer 1/Indianapolis	(317) 257-3336
Computercraft/Carmel	(317) 846-5996
Computerland/Anderson	(317) 649-1122
Computerland/Indianapolis	(317) 849-8811
Graham Elects./Indianapolis	(317) 634-3202
The Software Exchange/Indianapolis	(317) 251-7786
Von's Bookshop/W. Lafayette	(317) 743-1915
Book Corner/Bloomington	(812) 339-1522
The Computer Store of Jasper	(812) 482-9515
Custom Software/Terre Haute	(812) 234-3242
Data Domain/Bloomington	(812) 334-3607
Hoosier Elects./Terre Haute	(812) 232-8508
KOE Computers./Div. Knapp/Terre Haute	(812) 232-4361
Paris Office Systems/New Albany	(812) 944-7827
IOWA	
Computer Country, Inc./Marion	(319) 377-9437
Memory Bank/Bettendorf	(319) 386-3330
The Computer Ark/Decorah	(319) 382-8784
Computerland/Des Moines	(515) 270-8400
Omni Computer Center/Des Moines	(515) 276-8858
KANSAS	
Amateur Radio Equip./Wichita	(316) 264-9166
Computer Associates, Inc./Coffeyville	(316) 251-1800
Computerland/Hutchinson	(316) 662-6832
Computerland/Leawood	(913) 341-5335
Computerland/Wichita	(316) 684-3870
High Technology/Wichita	(316) 262-0315
Wichita Software Center/Wichita	(800) 835-1164
Book Shop/Manhattan	(913) 537-8025
Bronco Computer/Mankato	(913) 378-3117
Commonwealth Computers, Inc./Overland Park	(913) 648-8086
Computerland	(913) 492-8882
Computerland/Lawrence	(913) 841-8611
Computerland/Topeka	(913) 267-6530
Kansas Micro Computer/Lawrence	(913) 841-6348
Online Computer Centers/Overland Pk.	(913) 341-6651
Personal Computer Ctr./Overland Pk.	(913) 649-5942
The Computer Room/Beatty	(913) 341-3500
Amerisource Computer Store/Prairie Village	To Come

ALL

1/3 SOFTWARE
off

Software Catalog. FREE. Get the lowest price on every software program you need. 1/3 off list price *guaranteed*. And look what else you get from ITM:

Unlimited Consultation! ITM's consultants work with an amazing database indexed with over 300 software selection criteria — plus thousands of in-depth product reviews. You'll get the programs that are right for you. Quickly. Easily. It's the most sophisticated consultation service in the industry. Call toll free!

Over 2,000 programs to choose from. Hundreds added every month. All categories. All formats.

See any program demonstrated. Order any non-entertainment program for a *risk-free, thirty-day trial*. Full refund if not completely satisfied.

No minimum order. Buy just one program if you like. Quick shipments.

Call ITM now. Or, mail the coupon today and receive our FREE Software Catalog. Save hundreds—even thousands—of dollars on all of your software purchases with ITM.

American Express, Visa, or MasterCard honored.
Call toll-free today.

(800) 334-3404

In California (415) 284-7540

Software Catalog. FREE.

☐ YES. Send complete information for my review. Please include a free copy of ITM's Software Catalog.

NAME _____

COMPANY NAME _____

ADDRESS _____

CITY/STATE/ZIP _____

PHONE _____

☐ Individual ☐ Dealer ☐ Consultant ☐ Company

ITM

Software Division
We make software
buying simple.

Attn: Stevan Clouttree
936 Dewing Ave., Suite E
Lafayette, CA 94549-4292
(800) 334-3404 or
(415) 284-7540

PERSONAL COMPUTING DEALERS

KENTUCKY

Computerland of Bowling Green (502) 781-9990
Heathkit Electr./Louisville (502) 245-7811
Stereo Stable's Computer Stall/
Owensboro (502) 685-6016
Computer World/Ashland (606) 329-0545
MicroAge Computer Store/Lexington (606) 278-0304

LOUISIANA

Computers For All Inc./New Iberia (318) 365-9507
Computer Shoppe Inc./Metairie (504) 454-6600
Computer Terminal/New Orleans (504) 891-0007

MAINE

Coastal Computer Center/Brunswick (207) 729-0298

MARYLAND

Balance Corp. Center Inc./Baltimore (301) 625-1100
Benchmark Computer Center, Inc.
Towson (301) 838-4320
Chafitz/Rockville (301) 340-3300
Clinton Computer/Clinton (301) 868-0002
Computer Strategies Inc./Gaithersburg (301) 840-2173
Computer Unlimited/Towson (301) 321-1553
Computers Etc./Annapolis (301) 268-5801
Computerland (301) 340-8484
Computerland/Towson (301) 337-5555
Fredericks Computer Products/Frederick (301) 684-8884
Heathkit Electr. (301) 881-5420
Komar Ltd./Baltimore (301) 675-2200
Logal Choice/Elliott City (301) 465-3175
Program Store/Baltimore (301) 944-0200
Tri-State Computers/Salisbury (301) 742-2020
The Book Center/Cumberland (301) 722-8344
The Comm. Center/Laurel (301) 782-0600
The Xerox Store/Rockville (301) 424-1450

MASSACHUSETTS

Computer Source/Pittsfield (413) 443-7181
Retail Computer Ctr./Ludlow (413) 589-0106
Aero Computer/Worcester (413) 755-4775
Computer Store/Sudbury (617) 232-5470
Computer Store/Cambridge (617) 354-4599
Computerland/Boston/Wellesley (617) 235-6652
Computerland of Boston/Woburn (617) 938-1080
Computerland/Boston (617) 482-6033
Computerland of Boston/Reading (617) 942-0707
Eden Microcomputers/Osterville (617) 428-3515
The Game Shop/Acton (617) 263-0418
Harvest Computer/Cambridge (617) 547-3289
Heathkit Electr./Wellesley (617) 237-1510
Microcon Software Ctr./Watertown (617) 924-3333
The Micro Store/Taunton (617) 823-8106
New England Electronics CO/Needham (617) 449-1765
Ni-Mi's Corner, Inc./Cambridge (617) 547-3558
Out of Town News/Cambridge (617) 354-7777
Palace Spa/Brighton (617) 783-5858
The Program Store/Cambridge (617) 491-6690
Retail Computer Ctr./Ludlow (617) 935-8060
Small Business Group/Westford (617) 692-3800
Software Centre International/Lowell (617) 459-7311
Video Station/Woburn (617) 933-1445
YDI Elects./Needham (617) 449-1005
The Xerox Store/Boston (617) 451-5800
The Xerox Store/Burlington (617) 273-5665
The Xerox Store/Chestnut Hill (617) 566-1707

MICHIGAN

Allen Park Computer Center/Allen Park (313) 383-8254
Binary Corp/Berkley (313) 548-0533
Computer Connection/Farmington Hills (313) 447-4470
Computer Contact, Inc./Grand Blanc (313) 694-3740
Computer Corner/Lapeer (313) 664-6434
Computer Horizons/Livonia (313) 464-6502
Computer Mart/Flint (313) 234-0161
The Computer Shoppe/Flint (313) 238-1000
Computerland/Ann Arbor (313) 973-7075
Computerland/Southfield (313) 356-8111
Computerland/St. Clair Shores (313) 772-6540
Condor Business System Center/
Ann Arbor (313) 769-3988
The Family Computer Center/Berkley (313) 546-8114
Front Page Bookstore/Pontiac (313) 332-3431
Browse Books/W. Bloomfield (313) 855-9353
InfoSource/Southfield (313) 353-0660
Heathkit Electr. Ctr./Detroit (313) 535-6480
Maple Office Supplies/Southfield (313) 559-8811
Matrix Computer Center/Dearborn (313) 274-0600
Micro Station Inc./Southfield (313) 358-5820
New Horizons Book Shop/Roseville (313) 296-1560
Rainbow Computers/Troy (313) 528-3535
Rochester Book Center (313) 651-0199
Simtec/Birmingham (313) 855-3990
Spectrum Computers/Lathrup Village (313) 559-5252
Very Small Business Computers/Warren (313) 573-7260
Community Newcenter (313) 349-3510
The Computer Haus/Gaylord (517) 732-6544
Computer Mart/Lansing (517) 351-1777
Comtec/Owosso (517) 725-7326
ComputerKing/Edina (612) 920-1154
Computduct/Grand Rapids (616) 949-0281
Computer Mart/Kalamazoo (616) 329-1000
Computerland/Grand Rapids (616) 942-2931
Computers & More/Grand Rapids (616) 243-3525
Doc's Other Computer Store/Muskegon (616) 755-3906
Heath Computer Store/St. Joseph (616) 982-3215
Professional Computer System/
St. Joseph (616) 429-9616
The Computer Room/Kalamazoo (616) 343-4634

MINNESOTA

Granada News/Duluth (218) 727-9122
Rolandson Computer Ctr./Fergus Falls (218) 736-5925
Readmore Book & Card/Mankato (507) 345-5704
Bit by Bit Computer Resource Ctr./
St. Paul (612) 646-4833
CB Lektronix/South St. Paul (612) 455-2458
Computer Depot/Bloomington (612) 375-2008
Computer Professionals/Burnsville (612) 435-8060

Computerland (612) 559-1984
Computerland/Bloomington (612) 933-8841
Digital Den/St. Paul (612) 699-8442
Heathkit Ctr./Hopkins (612) 938-6371
Minnesota Book Center/Minneapolis (612) 373-5734
Online Computer Ctr./Minneapolis (612) 546-8814
Personal Business Systems/Minneapolis (612) 929-4120
Readmore Bookstore/Minneapolis (612) 333-3628
Schindler's Hennepin News/Minneapolis (612) 333-6942
The Software Centre/Bloomington (612) 881-4514
Weldon Elects./Plymouth (612) 559-1984
The Xerox Store/Edina (612) 929-4334
The Xerox Store/Minneapolis (612) 332-6866
The Xerox Store/St. Paul (612) 227-3366

MISSISSIPPI

The Book Store/Greenville (601) 332-2665
Computer World/Hattiesburg (601) 544-3135
Computerland/Jackson (601) 362-8755
Computerland/Washington County (601) 378-5861
Miss-Lou Computer Center/Natchez (601) 442-2836
Programs Unlimited/Jackson
Southeastern Aud. Vis./Starville (601) 324-0797

MISSOURI

Computer Concepts/Columbia (314) 874-3216
Computerland/St. Louis (314) 567-3291
Famous-Barr Computer Ctr./St. Louis (314) 241-5469
Gateway Elects./St. Louis (314) 427-6116
Micro-Age Computer Ctr./St. Louis (314) 567-7644
Sorbus Station/Maryland Heights (314) 432-0425
Computer Mart/Springfield (417) 862-6500
House of Computers/Joplin (417) 782-0880
Commonwealth Computers, Inc./
Kansas City (816) 356-6502
Computer Ctr./Kirkville (816) 627-1255
Computerland (816) 436-3737
Computerland (816) 364-4498
Computerland/Independence (816) 461-6502
Computerland/Kansas City (816) 842-4481
Midwest Computer Systems, Inc./
Carrollton (816) 542-0022
University Bookstore/NW MO. State U/
Maryville (816) 582-5151

MONTANA

Art's Electronics/Great Falls (406) 453-8543
Computerland/Billings (406) 259-0565
Computerland/Great Falls (406) 727-8700
Consolidated Services/Amissonia (406) 724-1811
Emery Computers Inc./Great Falls (406) 761-8954
Prairie Computers/Great Falls (406) 727-6992
Video Computer Store/Great Falls (406) 727-2720

NEBRASKA

Eakes Office Prod. Ctr./
Grand Island (308) 382-8026
Computerland/Omaha (402) 391-6716
Electronic Center/Lincoln (402) 476-7331
M & A Computer Systems, Inc./Hastings (402) 462-9545
Micro Technologies/Lincoln (402) 467-5521
Sunshine Computer & Software
Center/Hastings (402) 462-5300
2001/Norfolk (402) 371-2247

NEVADA

Apple Tree Electronics/Las Vegas (702) 459-4114
Harry's Business Machines/Reno (702) 322-4559
Home Computers/Las Vegas (702) 736-6363
PCS Computer Service/Las Vegas (702) 870-4138

NEW HAMPSHIRE

Blitzbytes/Concord (603) 224-8233
Bookwrights/Manchester (603) 669-4915
Computerland of Manchester (603) 668-2110
Computerland/Nashua (603) 889-5238
Computer Mart/Nashua (603) 883-2386
Computer Town/Salem (603) 893-8812
Microcon Software Centers/Manchester (603) 668-4080
North Country Computer Center/
Plymouth (603) 536-4163

NEW JERSEY

Apple Coo/Basking Ridge (201) 766-3977
Computer Dimensions/Westfield (201) 232-8300
Computer Discount of NJ/Mahwah (201) 529-4026
Computerland/Paramus (201) 845-9303
Computerland/Eatontown (201) 389-2333
Computerland/Morristown (201) 539-4077
Computer Mart of New Jersey/E.
Hanover (201) 428-0200

NEW JERSEY

Computer Mart of New Jersey/Green
Brook (201) 752-6300
Computer Mart of New Jersey/Iselin (201) 283-0600
Computer Nook/Pine Brook (201) 575-9468
Computer Technicians/E. Brunswick (201) 238-2780
Computer Universe/Paramus (201) 262-0960
Earth Rise Micro Sys./Madison (201) 822-0518
Entre Computer Center/Paramus (201) 342-0080
Felice's Follies/Red Bank (201) 842-2862
Heathkit Electr. Ctr./Fairlawn (201) 791-6935
Jefferson Computer Center/
Lake Hopatcong (201) 663-0224
Lloyd's Computers/Ridgewood (201) 445-8801
Micro Computer Svcs./Warren (201) 647-3900
MicroDynamics International/
Englishtown (201) 462-4600
Monmouth Computer Services/
Shrewsbury (201) 747-6745
Programs Unlimited/Greenbrook (201) 201-845-5800
Programs Unlimited/Paramus (201) 943-9444
Software City/Fairview (201) 447-9794
Software City/Midland Park (201) 575-4574
Software City/Tenbrook (201) 892-8317
Software Land/Elmwood Park (201) 791-9557
Software Network/Upper Montclair (201) 744-2952
Stonehenge Computer/Summit (201) 277-1020
The Computer Center, Inc./Montvale (201) 391-1006
Village Computer & Software Center/
Cedar Knolls (201) 540-0505

Vista Computer Shop/Matawan (201) 566-6066
William Elects Supply/Edison (201) 985-3700
Atlantic Computer Systems/Toms River (609) 240-3101
Computer Encounter/Princeton (609) 924-8757
Computer Mart of New Jersey/
Lawrenceville (609) 452-1858
Computer Workshop/Cherry Hill (609) 665-4404
Computerland/Cherry Hill (609) 795-5900
Computerland/Lawrenceville (609) 882-1400
Computerland/Norfield (609) 646-6611
MicroCon Software Centers/
Lawrenceville (609) 799-6444
Radio Shack/Moorestown (609) 244-7494
Radio Shack/Toms River (609) 234-2666
Software City/Princeton (609) 683-1644
Sorbus Station (609) 662-0997
The Software Center/Rocky Hill (609) 924-4988
NEW MEXICO
Computer Shop/Clovis (505) 762-3327
Computerland/Santa Fe (505) 988-8800
Computer Superstore/Albuquerque (505) 293-5370
Computer Tech Assoc./Las Cruces (915) 533-2108

NEW YORK

Computer Center/New York (212) 889-8130
Computer Discount Services/New York (212) 757-8698
The Computer Edge/Mt. Kisco (914) 666-6337
Computer Era/New York (212) 860-0500
Computerland (212) 840-3223
Computerland of Little Neck (212) 423-5280
Computerland of Wall Street/NY
Comtek/Brooklyn (212) 962-6131
Control Data Business Centers/NY
Dadel Sys./New York (212) 887-1020
Dadel Sys./New York (212) 921-0110
Discount Book Warehouse/Brooklyn
The Great American Software Store
Ltd./Flushing (212) 357-5522
Greenwich Village Computers/New York (212) 254-9191
J&R Music World/New York (212) 732-8600
Leigh's Computer World/New York (212) 879-6257
Magazine Emporium/New York (212) 864-0500
Majority New Dist./New York (212) 243-7770
Papyrus Books/New York (212) 864-8862
Programs Unlimited of Smithaven
Software City/Forest Hills (212) 261-1141
Super Business Machines/New York (212) 964-6666
Compu-Tech/Camillus (315) 471-7773
Computerland/Massina (315) 769-9971
Computers Etc./Syracuse (315) 446-6502
OmniFax Computer Store/Syracuse (315) 446-1284
Radio World, Inc./Oriskany (315) 736-0184
Computer Headquarters/Selden (516) 698-8636
Computer Microsystems/Manhasset (516) 627-3640
Computer Shoppe/Patchogue (516) 758-6558
Computerland/Little Neck (516) 887-4747
Computerland/Nassau County
Control Data Business Centers/
Garden City (516) 222-6462
Data Scan Comp. Sys./Farmingville (516) 698-6285
Future Visions Computer/Melville (516) 423-7820
Harrison Radio/Farmingdale (516) 293-7990
Heathkit Electr./Jericho (516) 334-8181
Programs Unlimited/Commack (516) 201-9950
Programs Unlimited/Jericho (516) 997-8668
Spartan Elects/Commack (516) 499-9500
Syosset Video & Elects./Syosset (516) 921-5454
The Xerox Store/Garden City (516) 294-6060
The Xerox Store/Great Neck (516) 829-3700
Castle Computers/Latham (518) 783-9405
Computer Room/Albany (518) 869-3818
Coothills Computer/Glens Falls (518) 792-0389
Future Distribution/Moers (518) 561-5703
Lela Computer Suitors/Albany (518) 272-2691
Computer Tree/Endwell (607) 748-1223
Computerland/Ithaca (607) 277-4888
Computerland/Johnson City (607) 277-4888
Computerland/Ithaca (607) 277-4888
Computerland/Johnson City (607) 277-4888
Computer Systems Center/Depew (716) 668-5998
Computerland/Rochester (716) 586-0378
Home Computer Ctr./Rochester (716) 244-6237
Micro Age Computer Store/Rochester (716) 244-9000
Modern Tek Shop, Inc./Snyder (716) 839-5800
Readout Computers/Buffalo (716) 634-9354
All Things Computer/Scarsdale (914) 723-6262
Computer Corner/White Plains (914) 949-3282
Computer Store/White Plains (914) 428-1661
Computerland of Rockland/New City (914) 638-4440
Heathkit/N. White Plains (914) 761-7690
ICCS Computer Center/Mt Kisco (914) 666-2358
Mr. Computer/Wapping Falls (914) 297-1223
Mr. Oz News Center Book Store/
New City (914) 638-0990
Programs Unlimited/White Plains (914) 761-9283
Software Etc./Central Nyack (914) 358-3004

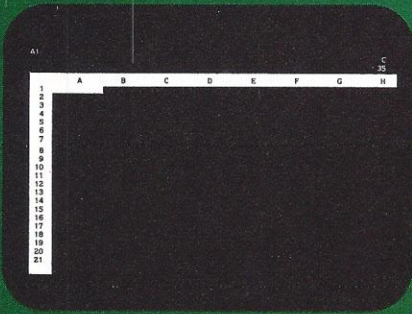
NORTH CAROLINA

Computer Alternatives/Asheville (704) 274-5404
Computer Alternatives/Hickory (704) 324-2040
Computerium/Charlotte (704) 377-9821
Dunlap Electronics/Wingate (704) 233-4996
Micro Management Products/Salisbury (704) 637-0335
Computer Alternatives/Wilmington (919) 799-5440
Computer Tree/Winston-Salem (919) 768-9820
Computerland/Greenville (919) 355-6110
The ComputerWare Store/Jacksonville (919) 346-8499
K & S Newland/Winston-Salem (919) 724-7537
The Program Center/Greensboro (919) 454-4708
Worldwide News & Specialties/Cary (919) 467-7130

NORTH DAKOTA

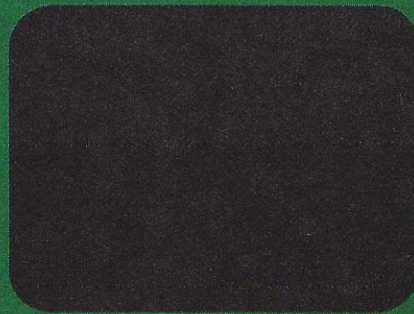
Computer 1/Fargo (701) 282-9471
Computerland/Fargo (701) 237-3069
Computerland Minot/Minot (701) 838-1266

VISICALC*



INTERACTIVE ELECTRONIC
WORKSHEET

YES



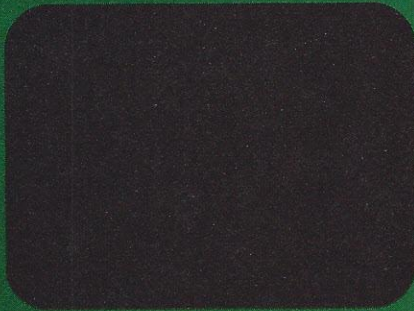
ON-LINE REFERENCE GUIDE

NO



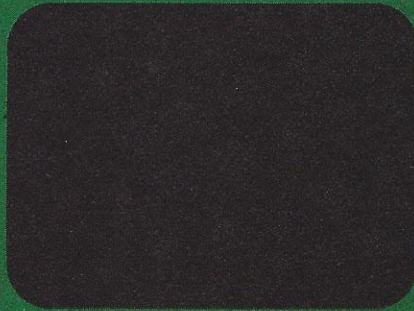
"NAMING" OF CELLS
OR AREAS

NO



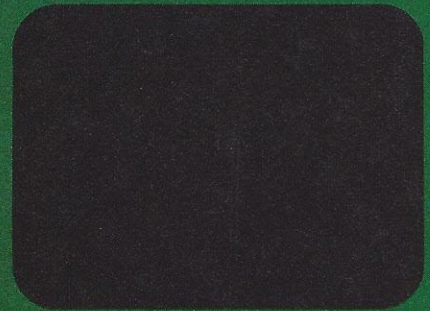
PLAIN ENGLISH PROMPTS

NO



INDIVIDUAL COLUMN
WIDTHS

NO



EXTENSIVE FORMATTING
CAPABILITIES

NO



PROTECTED CELLS

NO



MULTIPLE, LINKED
WORKSHEETS

NO



SORTING CAPABILITY

NO

VisiCalc® was a swell idea for then.

The next generation. First generation electronic worksheets were a good idea. They were early software management tools that could eliminate a lot of hours with a spreadsheet, calculator, pencil and eraser. Enter Multiplan, the next generation electronic worksheet that's as easy to use as it is useful.

Make comparisons. Compare Multiplan to any of the earlier electronic worksheets. We've given you some "prompts" above.

Compare learning time. Multiplan's tutorial book brings you up to speed. Fast. But Multiplan doesn't stop there. Multiplan's On-line Reference Guide gives you instant help if you have questions. It knows where you are in Multiplan and offers information related to your problem, right on the screen.

Compare ease of use. All Multiplan prompts are full length words or phrases. And Multiplan provides "naming," the ability to assign a plain English name to any

cell or area. "Gross Profit = Sales—Cost" rather than "AA44=AZ23—BK154." Which means you can work more intuitively. And faster.

Compare utility. Multiplan lets you link related worksheets so that information is transferred between them automatically. For instance, you can keep regional sales forecasts on separate sheets but link them with your overall company forecast. Then, just change the forecast for any region, and the company forecast sheet is updated automatically. Something you can't do with first generation worksheets.

Compare reports. Not just the work you can do, but the way you can present it. Multiplan's flexible formatting options allow you to produce presentation-quality reports. And its sorting capability lets you sort by either alphabetic or numeric order. So a sales manager who normally lists sales regions alphabetically could sort by amount sold and conveniently rank by sales performance. The

*Based on features in releases VC-202BO-AP2 and VC-156Y0-IBM of VisiCalc on the Apple II and IBM-PC respectively.

MULTIPLAN

**NOW AVAILABLE
FOR THE IBM
PERSONAL COMPUTER**

COMMAND: Alpha Blank Copy Delete Edit Format Goto Help Insert Lock Move
Name Options Print Quit Sort Transfer Value Window Xternal
Select option of type command letter 100% Free Multiplan: PROFIT.1

INTERACTIVE ELECTRONIC
WORKSHEET

YES

COMMAND OVERVIEW
The Multiplan worksheet consists of a grid of up to 63 columns in width and 255 rows in length. The screen has one or more windows into the worksheet, and an area showing command messages and status lines. The message line suggests the action to be taken or indicates errors when they occur. The status line displays coordinates of the active cell, its contents, percentage of storage remaining, and worksheet name. There is a highlighted active cell on the worksheet. The highlight can be moved around by pressing the direction keys. The same keys are also used for scrolling the contents of windows. The Ctrl-PgUp keys may be used to go to row 1 column 1 quickly.
The command menu offers a choice of commands. To get going you need to:
1. Select an active cell. The direction keys may be used.
2. Select a command. There are two ways to do this. You can move the highlight to a command word using the F9 and F10 keys and then press (Enter) or type the first letter of the command.
HELP Resume Start Next Previous
Applications Commands Editing Format Keyboard
Select option of type command letter 100% Free Multiplan: PROFIT.2

ON-LINE REFERENCE GUIDE

YES

VALUE: Sales - Cost
Enter a formula
R1C2C

"NAMING" OF CELLS
OR AREAS

Region 1 Profit Forecast

	Jan	Feb	Mar	Apr	May
Region 1 Sales	2000				
Region 1 Cost	1300				
Region 1 Gross Profit	700				

Enter reference to cell or group of cells
R1C2C Sales - Cost 98% Free Multiplan: PROFIT.4

PLAIN ENGLISH PROMPTS

YES

Region 1 Profit Forecast

	Jan	Feb	Mar	Apr
Region 1 Sales	2000	2200	2400	2600
Region 1 Cost	1300	1400	1500	1700.3
Region 1 Gross Profit	700	770	887	931.7

FORMAT WIDTH in (chars or default): 25 Column: 1 through 1
Enter a number, or d for default
R1C1 97% Free Multiplan: PROFIT.5

INDIVIDUAL COLUMN
WIDTHS

YES

Region 1 Profit Forecast

	Jan	Feb	Mar	Apr
Region 1 Sales	\$2,000.00	\$2,200.00	\$2,400.00	\$2,662.00
Region 1 Cost	1,300.00	1,400.00	1,573.00	1,730.30
Region 1 Gross Profit	\$700.00	\$770.00	\$887.00	\$931.70

Region 1 Gross Profit
Growth Rate = 10.0%
Cost Factor = 65.0%
FORMAT OPTIONS: commands: Yes No formulas: Yes/No
Select option
R1C1 97% Free Multiplan: PROFIT.6

EXTENSIVE FORMATTING
CAPABILITIES

YES

Region 1 Profit Forecast

	Jan	Feb	Mar	Apr
Region 1 Sales	\$2,000.00	\$2,200.00	\$2,400.00	\$2,662.00
Region 1 Cost	1,300.00	1,400.00	1,573.00	1,730.30
Region 1 Gross Profit	\$700.00	\$770.00	\$887.00	\$931.70

Growth Rate = 10.0%
Cost Factor = 65.0%
LOCK FORMULAS:
Enter Y to confirm
R1C1 97% Free Multiplan: PROFIT.7

PROTECTED CELLS

YES

The Company Sales Forecast

	Jan	Feb	Mar	Apr
Region 1 Sales	\$2,000.00	\$2,200.00	\$2,400.00	\$2,662.00
Region 2 Sales	\$1,900.00	\$2,118.50	\$2,362.13	\$2,633.77
Region 3 Sales	\$2,000.00	\$2,200.00	\$2,400.00	\$2,662.00
Total Company Sales	\$5,900.00	\$6,518.50	\$7,162.13	\$7,957.77

EXTERNAL COPY from sheet: Region 3 name: Sales
Enter name on external sheet
R1C2C 97% Free Multiplan: SALES

MULTIPLE, LINKED
WORKSHEETS

YES

The Company Sales Forecast

	Jan	Feb	Mar	Total
Region 2 Sales	\$1,900.00	\$2,118.50	\$2,362.13	\$6,480.63
Region 3 Sales	\$1,800.00	\$2,017.80	\$2,261.95	\$6,079.75
Region 1 Sales	\$2,000.00	\$2,200.00	\$2,400.00	\$6,600.00
Total Company Sales	\$5,700.00	\$6,336.30	\$7,024.08	\$19,060.38

SORT by column: 14 between rows 7 and 13 order: 1
Select option
R1C1 96% Free Multiplan: SALES

SORTING CAPABILITY

YES

Multiplan™ is a great idea for now.

result is a more meaningful and useful presentation of data. **Compare availability.** With Multiplan, you're not limited to a single range of computers. Multiplan is available for Apple® and for microcomputers that run MS™-DOS, XENIX™, or CP/M-80® operating systems. Multiplan supports both 40- and 80- columns on the Apple II.

Compare the source. Microsoft was the world's first microcomputer software company. Today, Microsoft software is running in well over a million installations, worldwide. Languages. Utilities. Business programs. All, maintained at the state-of-the-art.

Compare for yourself. Drop into your computer store. Compare Multiplan's powerful, user-oriented features to any electronic worksheet on the market. If you've been using VisiCalc, Multiplan's ability to directly utilize your VisiCalc files lets you easily upgrade to Multiplan. And that's just another of the many features designed

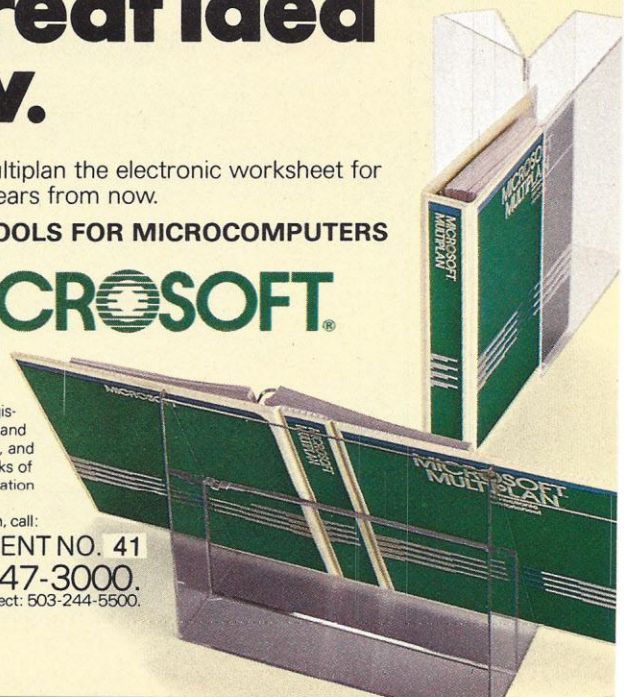
to make Multiplan the electronic worksheet for now. And years from now.

BETTER TOOLS FOR MICROCOMPUTERS

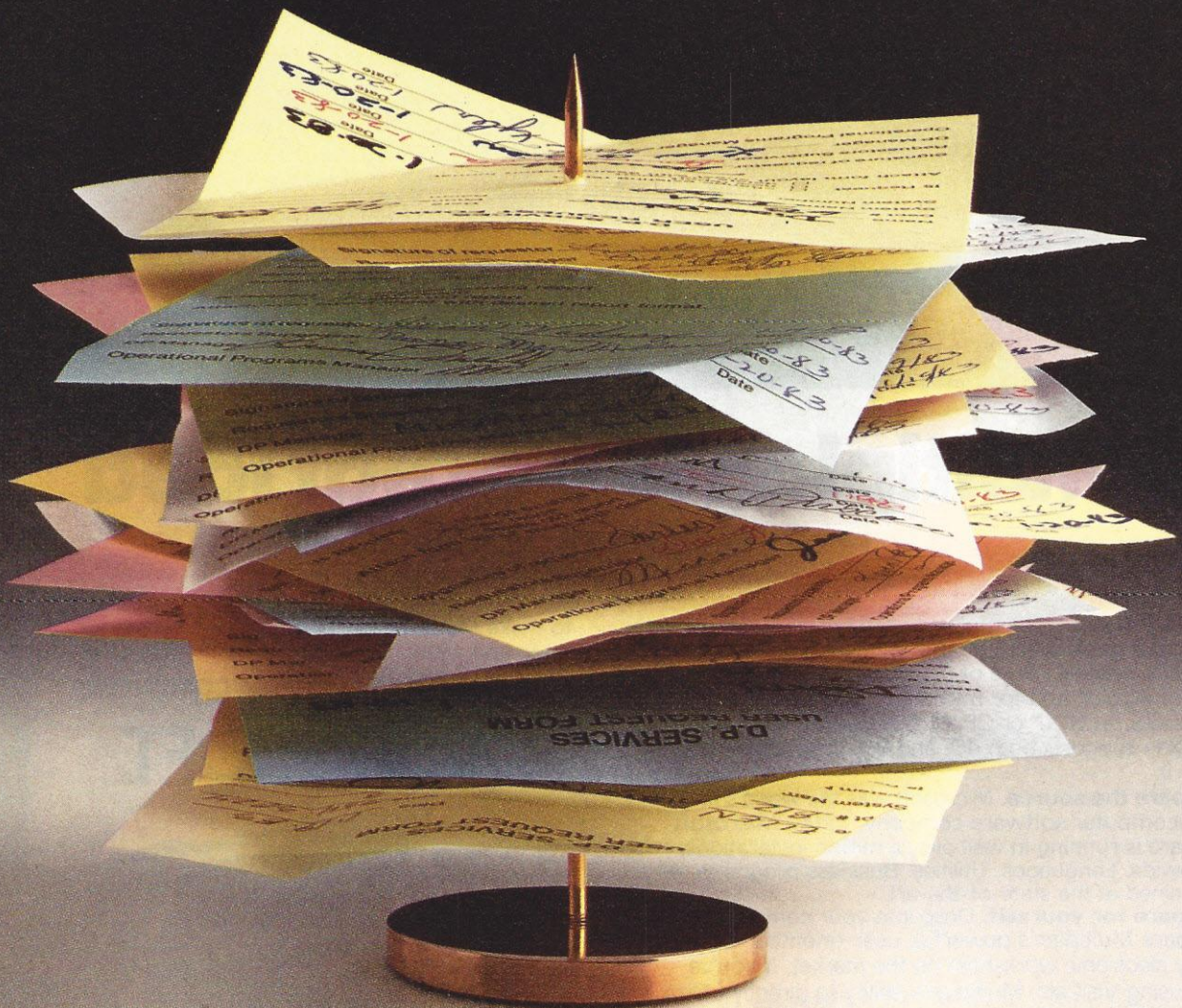
MICROSOFT

Microsoft is a registered trademark, and Multiplan, XENIX, and MS are trademarks of Microsoft Corporation. For product or dealer information, call:

DEPARTMENT NO. 41
1-800-547-3000.
In Oregon, call collect: 503-244-5500.



**WHEN DATA PROCESSING
SAYS THEY'VE GOT YOUR
PROJECT NAILED,
THEY REALLY MEAN IT.**



It's not that they don't want to fill your data request. It's just that they can't fill it, as fast as you need it.

Like, yesterday.

But don't feel helpless. Intel can show you how to take a project and do-it-yourself.

Without nails.

Because now, there's a complete system that provides you direct access to the company's data base.

A system that offers all the information you need. Right in your office. Right on your desk.

Not through data requests, that can take days or weeks.

But through an easy-to-use computer terminal, that gives you the facts in seconds.

Helping you to do your job faster and better.

Introducing the powerful combination that makes it all possible.

SYSTEM 2000.[®] Intel's Database Management System.

And iDIS.[™] Intel's Database Information System.

Together, they offer your company a state-of-the-art information center. Built by the company that invented the microprocessor.

The company that continues to lead the world in microprocessing.

The same company that also has more than a decade of leadership in database management.

SYSTEM 2000/iDIS assists you in

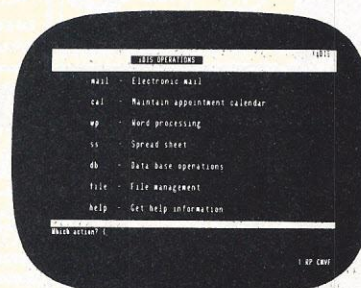
local database definition and creation, as well as updating and reporting.

You also get a wide range of software programs, to aid in planning, analysis and office management.

Even data processing tools are included. Allowing programmers to create custom applications for you.

	1	2	3	4	5	6	7
REGIONAL SALES FORECAST							
	Name	Budget	Update				
1	East						
2	Jones	5200	2500	12000			
3	Smith	3100	8700	27000			
4	Ellis	2150	2000	10000			
5							
6	10 Reg. Total	10400	18225	48500			
7	10 West						
8	12 Sanders	3000	5000	3500			
9	14 Johnson	2500	4000	1500			
10	15 Rodgers	1500	3500	5000			
11	16						
12	17 Reg. Total	7000	12500	21000			
13							
14	18 NATIONAL TOTALS	17400	30725	69500			
15							
16	Enter a number						
17	EXIT						

Credit our spreadsheet, with quick numbers directly from the corporate data base.



For ease-of-use, our menu format is made-to-order.

Faster than you can send them a data request.

And by management having the power to obtain its own information, the data processing department can get back to what they were originally hired to do.

Process data. Instead of paper.

Get all the facts. For you and your dp department. Call us toll-free. (800) 538-1876. In California, (800) 672-1833.

Or write us. Lit. Dept. H 12, 3065 Bowers Avenue, Santa Clara, CA 95051.

Or contact the Intel Sales Office nearest you.

And put a nail in data requests.

intel[®] delivers solutions

Leader
of the
Pack



5 1/4" \$189*
SINGLE SIDE
DOUBLE DENSITY
48 TPI W/HUB RING
2 YEAR WARRANTY
SOFT
SECTOR

8" \$195*
SINGLE SIDE
SINGLE DENSITY
2 YEAR WARRANTY
SOFT
SECTOR

5 1/4" \$219*
SINGLE SIDE
DOUBLE DENSITY
48 TPI W/HUB RING
SOFT,
10 OR 16
SECTORS

8" \$229*
SINGLE SIDE
SINGLE DENSITY
SOFT
SECTOR

LIFETIME WARRANTY
LIBRARY CASE
FREE
WITH EACH
TEN FLEXIDISKS
LIMITED AVAILABILITY

LIFETIME WARRANTY
LIBRARY CASE
FREE
WITH EACH
TEN FLEXIDISKS
LIMITED AVAILABILITY

5 1/4" \$319*
DOUBLE SIDE
DOUBLE DENSITY
48 TPI W/HUB RING
SOFT,
10 OR 16
SECTORS

8" \$249*
SINGLE SIDE
DOUBLE DENSITY
SOFT
SECTOR

LIFETIME WARRANTY
LIBRARY CASE
FREE
WITH EACH
TEN FLEXIDISKS
LIMITED AVAILABILITY

LIFETIME WARRANTY
LIBRARY CASE
FREE
WITH EACH
TEN FLEXIDISKS
LIMITED AVAILABILITY

- * Minimum order 10
 - * Packed 10 boxes of 10 diskettes with sleeves and labels
 - * Quantity discounts - 100 deduct 5%, 1,000 deduct 7%, 5,000 deduct 10%
 - * Add \$5.00 per case 5 1/4", \$7.00 per case 8" (case of 100)
- For shipping and handling Continental U.S.A. U.P.S. ground.

VINYL STORAGE PAGES
5 1/4" or 8" 10/\$5

SNAP-IT POWER CENTER
Turn one outlet into six
• Shock-safe
• Unbreakable
• 15 Amp Circuit Breaker
• Lighted On-Off Switch
\$19.95

**DISK DRIVE HEAD
CLEANING KITS**
Prevent head
crashes and
ensure error-free
operation
5 1/4" or 8" \$19.50

HARDHOLE DISK PROTECTORS
Reinforcing rings
of tough mylar
protect disk hole
edge from damage.
5 1/4" 8"
Applicators \$3 \$4
Hardhole Rings (50) \$6 \$8

SFD C-10 CASSETTES . . . 10/\$7
(All cassettes include box and labels.)
Get 8 cassettes, C-10
Sonic, and Cassette/8
Library-Album,
as illustrated,
for only \$8

LIBRARY CASES
8" Kas-sette/10 \$2.99
5 1/4" Mini Kas-sette/10 \$2.49

We also stock at FANTASTIC low prices
**MAXELL 3M DYSAN
WABASH OPUS**
Floppies, Tape, Data Cartridges,
Data Cassettes, and Disk Packs

• Written purchase orders accepted from government agencies and well rated firms for net 30 day billing. • International orders accepted with a 15.00 surcharge for handling, plus shipping charges. • C.O.D. requires a 10% deposit. • We accept Visa, Mastercard, Money Orders, and Certified checks. • Checks require bank clearances. • All shipments F.O.B. San Diego. • Minimum shipping and handling 2.00, minimum order 10.00. • California residents add 6% sales tax. Prices and terms subject to change without notice. • All sales subject to availability, acceptance, and verification. • All sales are final. • Satisfaction guaranteed or full refund.

We also offer printer ribbons, printwheels, type elements, equipment covers, power consoles, paper supplies, storage and filing equipment, furniture and many other accessories for word and data processing systems. Write for our free catalog.

Orders Only
800-854-1555

Information
619-268-3537

Modem Hotline (Anytime)
619-268-4488
Exclusive Monthly Specials

ABC
DATA PRODUCTS
(FORMERLY ABM)

ITT TELEX 4992217
8868 CLAIREMONT MESA BLVD
SAN DIEGO, CALIFORNIA 92123

GEMS OF WISDOM

The Epson Gets The Message

When I began to use my Apple /// with an Epson MX-80 printer, I found the ability to send a print size and style message from VisiCalc to the MX-80 most convenient. After becoming completely spoiled by this ease, I wanted to be able to send the same kind of message to the printer when using AppleWriter ///.

I could find no instructions in the manual for this feature, so I called the dealer and he couldn't help. Quite by accident I learned that if I left the printer on after setting the size/style with VisiCalc, AppleWriter /// could also use it. It doesn't matter if the computer is shut down; it's only when the printer is shut down that it returns to default print when it's turned on again.

Ann Wittwer
OMAHA, NE

This Gem of Wisdom wins \$25 for Ann Wittwer. If you have an anecdote, tip, or secret to share, send it (up to 250 words) to Gems of Wisdom Editor, Personal Computing, 50 Essex St., Rochelle Park, NJ 07662.

Not Software Bound

At work, I inherited an unused NEC 8001A, primarily for word processing. Adapting myself to its keyboard eccentricities, I rolled through the tutorial of Select and looked forward to happy days of easy computing. That is, until I had to do some actual word processing.

Two "blank" disks I inherited along with the NEC actually had some outdated information on them. I was unable to erase the files using Select. No other disks were available and I was pressed for time. Whenever I tried to erase the files or format them, I got a "DOS error" message.

Then I looked through the CP/M manual. Deciphering its method for formatting, I decided to give that a go. I pulled the Select disk and booted CP/M. Then I tried formatting the "blank" disk. It worked! When I rebooted Select, it recognized a truly blank disk, formatted and ready to roll.

Moral: You're not bound to any specific software in use for formatting disks or for accomplishing other housekeeping tasks. Think big! If you're having problems getting a program to do a housekeeping chore, try the operating system, then return.

Ralph Fletch
BOCA RATON, FL

This Gem of Wisdom wins \$25 for Ralph Fletch. If you have an anecdote, tip, or secret to share, send it (up to 250 words) to Gems of Wisdom Editor, Personal Computing, 50 Essex St., Rochelle Park, NJ 07662.

PICKING A PORTABLE

(continued from page 101)

commonly used; picked the software packages that, in their opinion, best answer those application needs; and packaged the whole thing at a very attractive price.

OK. What if everything about the system is great, but you just don't like that software? Well, you have to make a choice. You either get the system, and spend the extra money required to get the software you really want; or, get the system and run the bundled software, even though you don't particularly like it. Or you can get a different system.


Bundled operating systems

The saving grace in all of this is the popularity of the bundled operating systems. If you don't like WordStar, or Perfect Writer, or whatever, there's no problem. Many word processors run under the CP/M operating system, the one supplied with most of the portables. There are many packages appearing now that run under MS-DOS, the IBM Personal Computer's operating system, and this system is being supplied with portable computers now, too. So even if you don't like a bundled application program, you will have a large number of equivalent packages to choose from for most of the portable computers.

The subject of operating systems leads us to consider IBM Personal Computer-compatibility. There are several levels of this compatibility. The DOT computer from Computer Devices is said to be software-compatible with the IBM machine. That means programs written for the IBM computer will run on the DOT. But be careful here. The DOT comes with the new 3½-inch disk drives, which are terrific for space saving, but are a non-standard storage medium. The standard is still in question within the industry, although Tom Hayes at Osborne thinks a standard will be adopted by the end of the year. In the

meantime, you'd have to find a program for the IBM Personal Computer which is supplied on the smaller disks, which could be tough. Computer Devices supplies programs, of course, but availability from other publishers is doubtful. In this particular case, compatibility with the IBM Personal Computer means the DOT will run MS-DOS and programs that run under this operating system. It does not mean you can buy a program published for IBM and expect to put it in the DOT's drive and have it run.

The point here is that you have to be careful about compatibility with anything. Hayes says Osborne's new Executive computer, shown on this month's cover of *Personal Computing*, will, with the optional co-processor, run "most" programs written for the IBM Personal Computer. This means "all but the few which have been written to bypass MS-DOS for some I/O operations." If you have an IBM Personal Computer, and would like to get a portable that is compatible, a not unlikely possibility, find out whether your software will run on the Personal Computer-compatible machine (or CP/M portable machine, for that matter).

Portability can be a measurable advantage. A portable takes up very little space on the top of a desk, is easy to take with you on the road, doesn't cost an arm and a leg, and can be shared with your co-workers. You can easily take a portable with you on a vacation, if you're one of those who just has to work while away from the office. With the growing number of portables available, you're sure to find one that meets your needs. With these machines, as with any others, shop carefully to make sure that the system you buy fulfills the promise of personal, portable computing. You and your computer will have to work well together, if the partnership is to be a happy one. 

Inventory Reduction Sale On General Electric TermiNet* 30 KSR or RO 132 Column 30-CPS Printers!

KSR...\$375 plus tax
and
RO....\$325 shipping

Units include EIA board
and are in good working
condition.

Options

- Internal modem — \$100
- Single mag. tape — \$200
- Double mag. tape — \$250
Stores 100 K per cassette
- Quantity discounts
available
- Nationwide service available from RCA Service Company

* Registered trademark of General Electric

RCA

Call the RCA Data Services
Region Office in your area:

New York (212) 267-1550

Philadelphia (609) 234-8900

Atlanta (404) 934-9333

Dallas (817) 640-0900

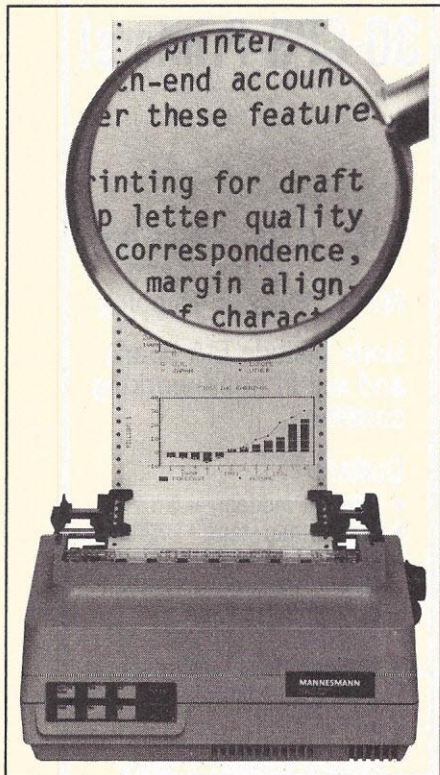
Chicago (312) 595-4910

Los Angeles (213) 728-7473

Micro users

Discover the
ultimate in
quality
printing.

**The Tally
MT 160L
\$895 complete!**



The Tally MT 160 is the one machine solution to every application. A printer for today that you won't outgrow tomorrow. It does word processing duty... letter quality text, proportional spacing, margin justification, auto centering. It faithfully captures your Micro graphics routines. And at 160 cps bi-directionally, it prints reports as fast as you can use them. Make it a point to see the MT 160 at your computer dealer.

**MANNESMANN
TALLY**

8301 S. 180th St., Kent, WA 98032
(206) 251-5524

CIRCLE 82

BUSINESS

DATA BANKS

(continued from page 117)

two weeks; Merker promised it in 24 hours, and came through.

Texas entrepreneur Michael Sidoric attributes noticeable increases in his business to using the electronic mail facility of his DBRS. His company, Informedia, was founded 13 years ago as a partnership with his wife, June, when both were still students at the University of Texas in Austin. Today, the company, which produces audiovisual presentations, is still in Austin, and has added one employee. Their list of some 60 clients include IBM's Austin division, Texas Tourist Development Agency, Southwest Bell, and Southland Corp. of 7-11 Stores' fame.

Sidoric says the main advantage to using a DBRS is the time savings. Before he became a subscriber, a presentation to a client in Dallas or Houston cost him a full day, not to mention air fares and car rental fees. "Now," he says, "we're able to send things via electronic mail... I can send the entire file to the client in a matter of minutes. When he gets in the next morning, he can get that file from his electronic mail box, print it out, react to it, get other people to look at it and react to it, and send me comments and criticisms. He can even feed it into his own word processor and make factual corrections, and send it back to me. All that time, I'm still working on projects that require attention here in Austin."

Although Sidoric has two personal computers—including a modified Apple that specializes in audiovisual work—he also uses his DBRS's computing power. "I can do word processing and scores of things that I couldn't afford the software for," he says. "It gives the small-computer owner tremendous power for very small cost."

"It's the same with financial planning," he says. "I can do our day-to-day stuff here, but when I'm working on really involved things, it's a lot


easier to use their on-line system, which is virtually unlimited."

DBRSs can offer measurable benefits to most business people and professionals—if they select their DBRS with care and use it judiciously. The first step is finding the DBRS most likely to provide the required information.

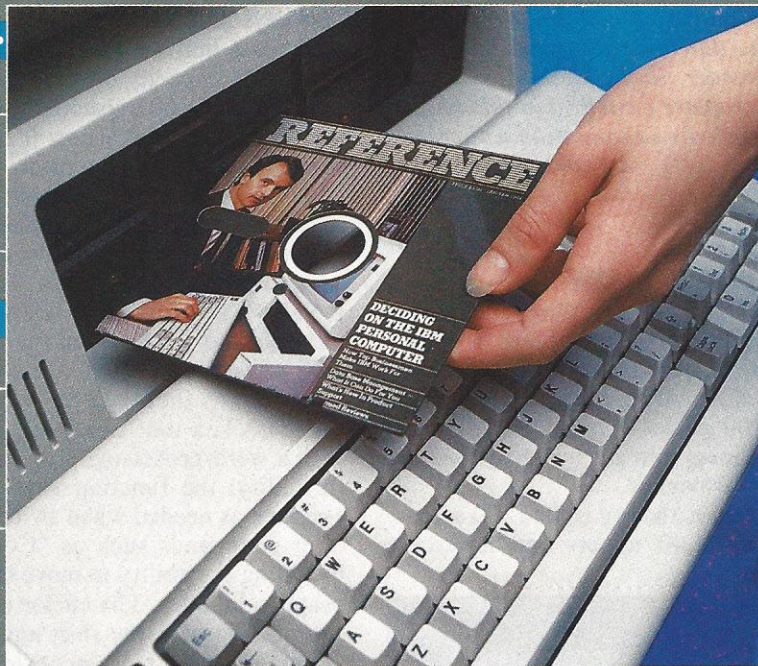
Costs considered

On-line costs vary with the data base, starting at \$5 an hour (at night or on weekends) and going up from there. Some services require a one-time subscription fee of \$100; others are as high as \$50,000 and more. The more popular DBRSs, such as The Source, CompuServe, and DIALOG (which is heavily oriented toward business, science, and technology) offer special discounts. In addition to the usage charge, there are often communications network charges and local telephone call charges. (Many DBRSs use private communications carriers readily accessed by a local call in most U.S. and Canadian cities.) According to DIALOG, "A typical search on a single data base averages about 10 minutes for experienced searchers and 15 minutes for beginners. Depending on the data base, a 10-minute search could range from \$5 to approximately \$15 (or somewhat more in some of the specialized data bases)"—hardly a clearcut estimate. Although charges are quoted on an hourly basis, they are always calculated to the nearest whole minute of actual use. Most DBRSs provide a cost breakdown at the conclusion of the search.

In July 1980, when Eastman Kodak raised its film prices by 30 percent, Mike Sidoric raised his by 10 percent. He has not raised them since, and, at this writing, had no intention of doing so. "It's got to stop somewhere," he says of the inflationary spiral. "Instead of working harder, we need to work smarter."

Plugging in to a DBRS may be one way of doing just that. 

THE MOST VALUABLE 'SOFTWARE' FOR YOUR IBM PERSONAL COMPUTER



If you've invested your time and money in the IBM Personal Computer, you can get the most productivity with **REFERENCE**, the **Business Journal for IBM Personal Computing**. **REFERENCE** is the premiere source for reliable, plain-English information on everything about the IBM PC. You can learn what other companies are doing with communications, spread-sheet programs, data and word processing, graphics, and networking, to name just a few areas that are covered **in-depth**, from a **businessperson's point of view**.

REFERENCE won't bog you down in the technical details or bore you with programmer's jargon. Instead, you'll find every issue packed with

expert advice and valuable suggestions on how to get more out of your PC than you ever thought possible.

Regular columns on

major applications as well as critical reviews of current software and hardware will make **REFERENCE** as fundamental to your productivity as your operating manual. That's why we say that we'll be the most valuable 'software' that you can buy for your IBM PC. We guarantee it, or you can cancel your subscription for a full refund. Fill out the coupon or send in the attached card and take advantage of our special offer, **THE FIRST ISSUE FREE**, today! Or you can call (603) 673-9544 and charge it to your Mastercharge or VISA. Don't wait!



Yes, I'd like to get more out of my IBM PC and receive the first issue free! If I'm not convinced that **REFERENCE** will help me, I can cancel my subscription with no further obligation.

- I currently own an IBM PC.
- I do not own an IBM PC, but am considering buying one.
- I own or am considering a different IBM-compatible computer.



CARD # _____

SIGNATURE _____ EXP. DATE _____

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

CIRCLE 190

PC0583

REFERENCE™

P.O. Box 100
Milford, N. H. 03055

New Products Reflect Advances In Hardware Design

Each month Personal Computing scans the hardware market to keep you up to date on everything that's new. Those products we consider to be most useful and exciting in this month's crop are described in this section and commended for your closer examination. Others are listed in Showcase of Products, our special subscriber section.

LIGHTWEIGHT PORTABLE IS FUNCTIONAL AND USER-FRIENDLY

The Radio Shack TRS-80 Model 100 is a portable computer that approaches the concept of portability with unusual practicality, and the result, the Micro Executive Workstation, is bound to attract considerable attention. The Model 100 packs a great deal of functionality plus user friendliness into a 2 by 11 by 8½-inch package that weighs only 4 pounds.

The first aspect that catches the eye is the LCD screen, which offers eight lines of 40 upper- and lowercase

tion keys and four cursor-control keys. The Model 100 includes a built-in real-time clock, a 300-baud modem, and RAM capacity of 8k, expandable to 32k.

The Model 100's specifications are impressive (in addition to the above features it includes such niceties as a five-octave sound generator, bit-addressable graphics, and RS-232-C and parallel outputs). But what makes this a unique portable is the application software included—text editor, scheduler, address handler, a sophisticated communications program, and Microsoft Extended BASIC—all resident in 32k of ROM.

As soon as power is on, the display shows the date and time of day, and offers a menu of functions along with listing of any files the user may have set up. By switching into TEXT, a user can create and edit notes and memos with a word-processing program that offers quite a bit of flexibility; the function keys (which are automatically assigned as needed when switching into any given mode) offer commands such as "Copy," "Cut," and "Select," including the ability to move blocks of text with cut-and-paste techniques. The cursor control keys can be used in conjunction with the shift and control keys to provide a variety of cursor movements in the text mode. The output can be transferred to any Radio Shack parallel printer, or standard ASCII text files can be sent to another computer for additional processing.

The second application program is a scheduler which allows the user to keep a schedule of appointments, listed by date and time, and then search it on the basis of any given characteristic. A similar search routine is available for the third application, the address organizer. Entered in random order, addresses and telephone numbers may be accessed by any identifying characteristic and listed on the screen or printer. In addition, this mode can make use of the built-in modem: When a given telephone number is displayed on the screen, the auto-dial function can be used to dial the number directly. The auto-dial function includes a pause character, to allow calling through switchboards.

This brings us to the Model 100's fourth, and perhaps most impressive software feature: a communications program called TELCOM. TELCOM operates with the built-in, 300-baud direct-connect modem which connects to the telephone line via a standard Bell modular plug on the back of the unit. (An acoustic-coupled modem will soon be available for the Model 100, for situations where direct-connect is impossible.)



The Radio Shack TRS-80 Model 100 portable computer includes a built-in clock, a 300-baud modem, and 8k of RAM.

characters—a large enough display for convenient word processing. The keyboard is a full typewriter layout, with a solid feeling, and an "imbedded" numerical keypad—meaning one portion of the keyboard is software-selectable to operate as a 10-key data pad. In addition, directly below the screen is a row of programmable func-

In TELCOM, all RS-232-C and modem parameters are keyboard selectable, including half- or full-duplex communication and one-key uploading or downloading of ASCII text files. In addition to auto-dial, the TELCOM software allows auto log-on for information utilities, as well as commands for going directly to the portion of the service you want. In practice what this means is that with a short BASIC program provided in the Model 100 manual, the user can telephone, say, the Dow Jones News/Retrieval Service, receive quotations on any number of specific stocks, download and store the information, and sign off—all with a single keystroke.

The Model 100 operates on four AA batteries or an AC adaptor, in conjunction with built-in nickel cadmium batteries that maintain the unit's memory for up to 30 days when the power is off. The ni-cads recharge off either the AA batteries or the AC adaptor. A user-definable auto shut-off saves batteries, without any loss of programs or memory, and a low-battery indicator signals when only 15 minutes of power remain. The Model 100 has a full bus line, allowing a potentially wide range of peripherals; a bar-code reader will probably be among the first of those. In addition, on the bottom of the machine is a plate covering an additional ROM socket for application programs; an early contender here is likely to be some form of spreadsheet.

With 8k of memory, the Model 100 will cost \$799; the 24k version will list at \$999. Optional 8k add-ons (\$199.95 plus installation) can increase the memory to a maximum of 32k. In all, the Model 100's combination of full keyboard and large display, along with application software tailored to the needs of a traveling executive, provides an impressive package that could set the standard for portable computers.

FOR MORE INFORMATION: RADIO SHACK, 1800 One Tandy Center, Fort Worth, TX 76102, or visit your local Radio Shack store or Computer Center.

—Michael Rogers, Senior Editor

OSBORNE EXECUTIVE DEBUTS

The Osborne Executive, an updated version of the best selling Osborne 1 portable computer, has arrived. The Executive is designed not only to answer some of the objections to the original, but to expand into new territory as well.

The first thing Osborne owners will notice about the Executive is that the old screen, which many users supplemented with an external monitor, has been replaced by a 7-inch amber screen. Amber is the color considered by many to provide the most comfortable viewing, and is required by law in some European countries. In another screen improvement over the Osborne 1, the Executive will arrive with a standard 24 by 80 display. Osborne

made room for the expanded monitor by converting to "half-high" floppy disk drives and moving both drives to one side of the screen. This leaves room for storing up to 40 diskettes, and also opens up space for a possible integral Winchester disk—although Osborne designers are still trying to determine whether there exists a hard disk



The Osborne Executive is an enhanced version of the first portable computer with a 7-inch screen and 128k of memory.

tough enough to withstand the rigors of portability.

The Executive's internal changes are even more extensive than its external modifications. The unit, still Z80A-based, will come standard with 128k of RAM in a bank-switched configuration. The communications abilities of the machine have been considerably augmented. The Executive will have a full RS-232-C port with synchronous capabilities, as well as a bidirectional parallel port that is closer to IEEE specifications than its predecessor. To utilize these expanded abilities, a 3270 terminal emulator is available immediately, with a variety of others to come. Two other internal changes are of interest: The main memory is located on a piggyback printed circuit board, providing nearly 4Mb of bank-switched memory. And the Executive addresses the cooling question with a new thermocoupler-controlled fan that varies the air flow according to environmental needs.

The standard operating system on the Executive will be CP/M+, which provides markedly faster disk input and output. The Executive will also include new documentation, which the company says is smaller, less imposing, and more accessible than the original Osborne manuals. At some point in the fall, a new modem will be offered, with the same compact slip-in housing as the current Osborne modem, but with 300- and 1200-baud capabilities.

One interesting feature of the new Osborne is that its character set is "writable"—a program is available allow-

HARDWARE OF THE MONTH

ing the user to modify the appearance of the individual fonts. There are two 128-character sets that come with the Executive, one containing graphics characters similar to those found on the TRS-80. To modify characters, the user calls up the Character Editing Menu and selects the character to edit, which then appears as a single large character made up of asterisks. Menu commands allow the user to add or delete rows or columns of asterisks, which in turn alters the shape of the actual small character in memory.

Users will probably find that the Executive addresses almost all the minor and major difficulties of the Osborne 1, from cooling to printer interfaces, as well as offering more depth and utility in its functions. Of course these upgrades are reflected in the price; with a full complement of software (WordStar, MailMerge, SuperCalc, CBASIC, MBASIC, UCSD-p, and a new data-base manager called Executive Data Base), the Executive will list at \$2495. The Osborne 1, by the way, will continue to be available, and company representatives hasten to add that the new machine is not intended as a replacement for that model.

That, however, is not the whole Osborne story this month. At the same time the Executive was announced, an enhanced version was announced as well. This enhancement will be the long-rumored IBM-compatible version, which will be achieved by adding an 8088 microprocessor to the existing Z80A-based unit. The enhanced version of the Executive will run both MS-DOS 2.0 and CP/M-86. It will contain an additional graphics board, to provide graphics compatibility (in monochrome) with IBM software (adding, for example, a 25th line to the display).

The price of the enhanced Executive will run between \$2995 and \$3195. At some point in the future, the 8088 microprocessor will be offered as an upgrade on existing Executives.

FOR MORE INFORMATION: OSBORNE COMPUTER CORPORATION, 26500 Corporate Ave., Hayward, CA 94545; (800) 227-1516, in California (800) 772-3545.

CIRCLE 456

—Michael Rogers, Senior Editor

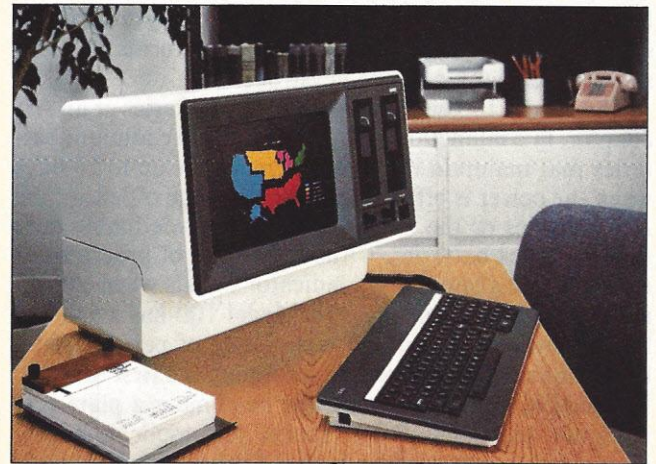
NCR ENTERS PERSONAL COMPUTER MARKET WITH AN EXPANDABLE SYSTEM

Options for NCR's new Decision Mate V personal computer allow this machine to expand from an economical bread-and-butter computer priced at \$2800, to an advanced dual-processor system with high-resolution color and graphics starting at \$3400. Both systems are based on the same machine.

The basic Decision Mate model contains 64k of RAM which is expandable to 512k; two 320k floppy disk drives

(a 10Mb hard disk drive can be substituted for one of the floppy disk drives); seven expansion slots; and a high-resolution green display screen.

A high-end model can be fitted with a color or monochrome green CRT. Both CRTs have anti-glare coatings, show 80 characters on 24 lines, and 640 by 400 dot graphics which can be fully intermixed with text. A second processor in the high-end model enables it to run



The basic NCR Decision Mate V contains two floppy drives, seven expansion slots, and a high-resolution screen.

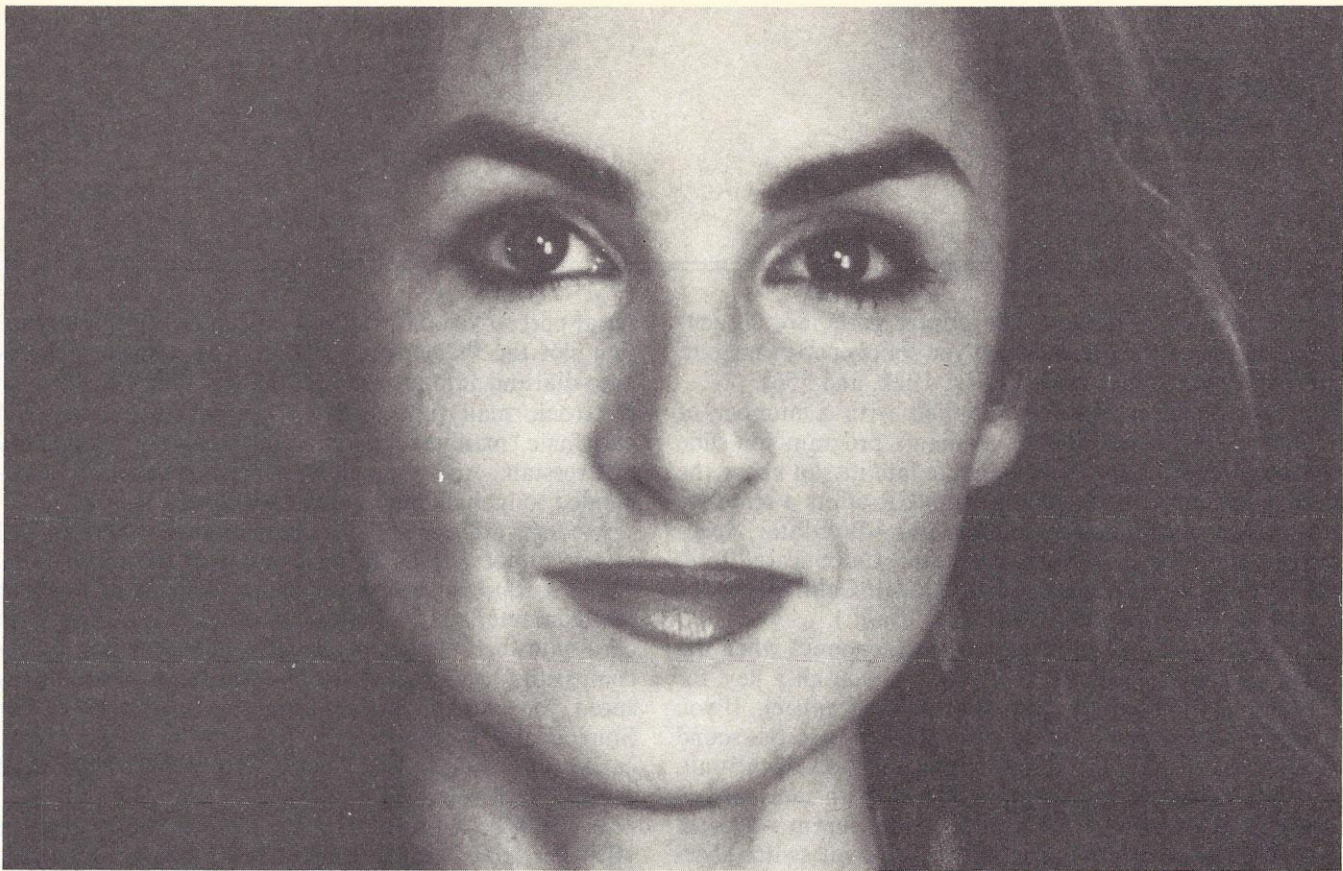
CP/M-86 and MS-DOS-based software, as well as CP/M programs. Dealers can retrofit the base model with this second processor; however, the color CRT cannot be added after purchase.

Like most computers with outstanding graphics capability (which you get with or without the color option), the NCR uses a separate processor—with its own RAM—to run the display. This speeds the overall system, since the main processor doesn't get tied up in managing the complexities of the color graphic display. We found the color display to be as sharp as the monochrome screen. It's even suitable for word processing.

The Decision Mate comes with an Atari joystick-compatible port on the side of the keyboard. NCR officials were quick to point out that the port could also accommodate a "mouse" like the one on Apple's LISA.

NCR is also encouraging other firms to make or adapt compatible hardware and software products for the Decision Mate machines. To foster this process, all Decision Mates use the CP/M operating system. Higher-priced models use operating systems that run on the IBM Personal Computer as well.

When you decide to plug in printers, modems, more memory, etc., you're in for a nice surprise. You don't have to unscrew, unsnap, or pry off anything. A box-like cavity in the rear of the machine contains the seven expansion



“A Database That Catches Mistakes? That's My Qbase.”

**Presenting Qbase,™ The Personal Database And Reporting System
That Prevents Mistakes Before They Become Expensive. Just \$189 Complete.**

There's no question that databases are useful tools for storing and retrieving information. Thousands of professionals use databases to monitor inventory, manage mail lists, record fixed assets, and keep track of personnel records.

So what's the problem?

NOT ALL DATABASES ARE CREATED EQUAL

In hundreds of personal computer applications, users agree on one thing: there's nothing more aggravating than a database that lacks all the features to do the job that needs to get done.

And of all the database features used by experienced users, none is more often called for than data entry checking.

Why is that so important? Because experienced users know how many aggravating hours they can waste fixing mistakes that their database should have caught.

Fortunately there's Qbase, the only full-feature database in its price range that can substantially reduce common input errors.

PREVENT DATABASE CONTAMINATION

Qbase uses sophisticated data checking features normally found on large systems. Functions that catch invalid alpha-numeric sequences. Check for minimum/maximum number lengths. Enforce data inputs where mandatory. Require date formats. Allow for yes/no replies. And verify that alphabetic and numeric values lie within pre-specified ranges.

And then we added an embedded calculator that automatically computes taxes and commissions. It even accepts credits and debits against balances due.

And reports? Qbase includes a powerful reporting facility—at no extra charge. With it, you can produce sorted reports with sub-totals AND totals. Moreover, all report definitions are fully documented and stored in a library. So there's no guessing which report does what. Just call for your favorite report and it's done.

Write or call for your free brochure, "How To Keep Errors Out Of A Database." See for yourself what data checking can do to save you time and aggravation. Write to:

Applied Software Technology
14125 Capri Drive
Los Gatos, CA 95030
or call 408/370-2662

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE (AREA CODE) _____

 **Qbase**
Personal Database/
Reports

For Use With IBM PC and APPLE II

CIRCLE 118

HARDWARE OF THE MONTH

slots. Expansion devices, like printer ports, are all contained in plastic cartridges that you simply pop in and out. Memory cartridges come in 64k, 192k, and 256k.

The Decision Mate is supplied with a number of function-key labels. Before running a program you slide the appropriate key label template into its slot above the 20 programmable function keys. NCR offers a template with each of its initial seven programs—WordStar, SpellStar, MailMerge, InfoStar, DataStar, CalcStar (all from MicroPro International of San Rafael, Calif.), and SuperCalc (from Sorcim of San Jose, Calif.).

NCR paid a lot of attention to ergonomics when designing the Decision Mate. Each time you hit a key, for example, the computer provides audible feedback. If you don't want or need this feature you can turn the sound down or off using the speaker control in back of the unit.

The keyboard has a very soft feel, with unusual key shapes and positions. All keys have auto-repeat, and a set of small switches under the keyboard lets you switch character sets to six foreign languages.

IBM Personal Computers, Apple //s, and NCR Decision Mates can be combined in networks of up to 64 machines, using an adaptation of the Corvus Omninet.

The base model Decision Mate costs \$2800 complete with CP/M and a "hidden" feature found in few other computers: NCR's customer hotline, which is available from 8 a.m. to 5 p.m. (your time zone) anywhere in the continental United States.

The dual-processor version of the Decision Mate starts at \$3340, and will be available in June. The color CRT costs \$910. The 128k memory cartridge costs \$350, the 256k unit is \$900, and the 512k cartridge is priced at \$1950. A parallel or serial printer interface cartridge adds \$200 to \$250 to the cost of the system.

FOR MORE INFORMATION: NCR CORP., Dayton, OH 45479.

CIRCLE 453

—Lee Thé, *Associate Editor*

COMPLETE PLUG-IN TELECOMPUTING PACKAGE FOR THE IBM PERSONAL COMPUTER

Ven-Tel believes that the typical IBM Personal Computer owner is looking for solutions that are both powerful and easy to implement. So this maker of high-speed modems for Fortune 1000 firms has entered the personal-computing world with a one-step telecomputing package.

Ven-Tel's PCmodem includes a plug-in modem card, cable, and Crosstalk, a sophisticated telecomputing program that's been customized for the PCmodem. All you need is an IBM Personal Computer and a phone company modular wall outlet, with or without a telephone. The package includes a second cable so you can still use a phone with that outlet. And the modem card includes a

serial port so you can still run a printer from the expansion slot the PCmodem occupies. The modem includes auto-dial and auto-answer capabilities—you can use it for electronic mail (unattended file transmission between electronic "mailboxes")—although that's not a capability of Crosstalk. And this medium-speed modem can be expanded to include high-speed capabilities.

Modems are classified by compatibility to certain Bell system protocols. The PCmodem is Bell 103-compatible. That's a 300-baud speed protocol corresponding to about 300 characters per minute. You can plug a piggyback card onto the PCmodem card that adds full Bell 212A-compatible operation at up to 1200 baud—the highest speed you can use with information utilities like The Source and CompuServe. But unlike most 212A-compatible modems, you don't have to add the 1200-baud module until you need it.

It would be hard to imagine a simpler way to turn an IBM Personal Computer into a telecomputer. You slide back the case on the IBM and place the PCmodem card into any of the expansion slots, plug a little wire into the IBM's speaker assembly, attach the phone cable(s), plug the printer into the card, and close the case. Then pop the cable into the wall outlet, attach a phone if you want to, put the Crosstalk diskette into the IBM—and go.

The preconfigured program lets you use your IBM as a smart mainframe terminal, and to transfer error-checked files between any two computers with Crosstalk software. Crosstalk can transfer error-corrected files between any mix of both PC-DOS and CP/M-based systems. You can store complete sets of communications protocols for the different computers and information utilities you deal with, and then have the system automatically engage the right protocol when you select the appropriate phone number from the directory you build in Crosstalk.

Dialing is especially easy, because the Ven-Tel can do speedy touch-tone dialing as well as the slower pulse-type. If you forget how to do something in the program, a HELP function can refresh you on the command structure. Also, auto log-on lets you automate complicated dial-in procedures for utilities like Sprint, MCI, The Source, CompuServe, etc. The same facility makes it simple to log onto mainframe computers. Thus, two impediments to easy telecomputing—protocol differences and log-on problems—are overcome. Because you're connected to the IBM's speaker, you can hear when you get a busy signal. That saves the time spent with many modems waiting to see if your call is going to connect.

The PCmodem works with just about any other telecomputing software for the IBM Personal Computer, giving it great versatility. If you decide to add the 1200-baud option, just open the IBM's case and plug the module onto the card. That way you still only use one of the IBM's four expansion slots.

173

HARDWARE OF THE MONTH

columns wide and 32 rows deep and expands the word-processing windows to 80 columns wide by 48 columns long. The current standard screen size is 80 by 24. While some word processors are already equipped to support the Ultraterm, many programs will have to be updated to take into account the wider window.

We saw the Ultraterm demonstrated on an Apple //e with the Apple /// monitor. The Apple /// monitor is one of the two monitors recommended by Videx for its expansion card, the other being the Amdek Video 310A amber monitor. Whichever monitor is chosen—and others will also fit the bill—it must be a CRT with a high- or medium-persistence phosphor.

Perhaps the most impressive achievement of the Ultraterm expansion board is that the character set it produces is so sharp that it's difficult to see the dots that make up



The Videx Ultraterm offers an 80-column by 48-line display for word processing on Apple and Franklin computers.

each character. The sharp images are produced by using a display technique called interlace. The way the technique works explains why a low-persistence phosphor CRT cannot be used with the board. Interlace controls so many phosphor locations at one time during the display that they can't be refreshed quickly enough for vibration not to show on a low-persistence phosphor monitor.

Scrolling works smoothly. Moreover, the board gives you keyboard control of several intensity levels on the display, including two levels of intensity for inverse displays (dark characters on a bright background).

When we saw the Ultraterm, Videx demonstrated it with WordStar and VisiCalc. WordStar, though, can be configured for the display in the software's current format. VisiCalc requires using an Ultraterm 128-column pre-boot disk that Videx provides. Videx claims that unprotected CP/M and Pascal software can generally be configured by the user for Ultraterm, but that other packages will probably need to be updated to use this device.

Videx's Ultraterm works on the Apple //e, the Apple

///, the Apple II Plus and the Franklin 1000 using the Apple /// monitor. Videx claims that the Ultraterm consumes a reasonably low amount of power, despite its capabilities. At the time of writing price had not been determined, but Ultraterm is expected to cost in the \$300 range.

FOR MORE INFORMATION: VIDEX INC., 897 N.W. Grant Ave., Corvallis, OR 97330; (503) 758-0521.

CIRCLE 551

—Lee Thé, Associate Editor

NEW RADIO SHACK MODEL 12: VERSATILE COMPUTER FOR GROWING BUSINESSES

The Radio Shack Model 12 will appeal to professionals with moderate current needs—and unlimited ambition for future expansion. It's especially timely for those who aren't sure just how they'll want to expand later, because it can grow into either a multicomputer network or a multiuser 16-bit system with satellite terminals. A thorough upgrade of previous machines, the Model 12 seems destined to become Tandy Corporation's flagship computer.

The Model 12 comes with a Z80 8-bit processor; a built-in, 1.25Mb 8-inch floppy-disk drive; a detachable 82-key keyboard; a green phosphor 12-inch display; 80k of RAM with 64k available for programs and user data; three peripheral ports; a port for additional floppy drives; and the latest TRSDOS 4.2 operating system.

Everything about this computer is big. It takes up a 28-inch by 21-inch desk top, but its sleek styling makes it look smaller. The low-profile keyboard includes a 10-key pad and eight programmable function keys. The computer has its SHIFT and RETURN keys where Selectric-trained hands expect to find them, and all keys have a non-slip matte finish. You can turn off the electronic keyclick sound if you wish. In addition to alphanumeric, you can enter graphics composed from 32 basic shapes, using the keyboard.

It's easy to read the green screen's 80-character by 24-line display unless you have glare where you work. If this is the case, however, you can buy a Radio Shack polarized glass add-on panel (\$30) to take care of high-glare situations. Unlike the less expensive black nylon mesh panels, the glass screen does not reduce resolution.

Plug in a printer—and maybe a modem—and you're in business. The basic Model 12 should keep most buyers happy for quite a while, especially if they opt for a second drive. But if the basic capabilities are all you'll ever need, there are less expensive computers to consider. The best feature of the Model 12 is its enormous expandability. The Model 12 gives you the option of creating a large-storage, 8-bit system with high-resolution graphics, or a 16-bit, large-RAM multiuser system.

In the single-user path, you could start by adding the

HERE'S THE PERSONAL COMPUTER AD OUR COMPETITION DOESN'T WANT YOU TO READ.

It's an ad for NEC's APC™ Advanced Personal Computer. A solutions-oriented system that solves business problems in the simplest, most cost-effective way. The APC supports both CP/M-86™ and MS-DOS™. It can store more information than any system in its price range. In short, it's got the best price/performance of any personal computer. That's why our competition would prefer that you never see our system.

We asked some business men who sell systems why they preferred us. The reasons were nearly uniform. They said the APC was the only personal computer on the market that gave you the power of a 6-bit microprocessor, a hard disk, a color display, a printer, and a communications port. For the price, the APC was the best value. These men said they would not have sold their systems if they had known about the APC.

urs,
ther."
ve sys-
s good

couldn't
any that
well as

em that
s in the

"That APC of yours is the most powerful computer of any I saw. I don't know how you did it for that price."

"Now that I've used it for a while, I see why you named it the Advanced Personal Computer."

And that from businessmen who have tested the competition! When you see the APC, you'll understand why, at least, others, all of these businessmen picked NEC.

Our business software was optimized to take advantage of the APC's unique hardware features. That makes system operation faster and easier.

Our software includes a full set of general accounting packages, word processing, mailing list management, business planning, database management, and communications. And we're readying many more.

We're the only company to back our software with a unique unconditional guarantee. It will work or you get your money back.

Our high-resolution color graphics run circles, arcs and lines around everybody else. The APC's screen images—lines, characters, pictures—are unprecedented in their clarity. Colors against resolution competitive systems often must.



PLC 0583

Name _____

Title _____

Company _____

compar... the APC
for plan... analysis,
data... manager... word
process... As part... al
commu... work, t...
the APC... al for...
ronic m... ces.
comput... rieta...
data...
specific an...
the APC...
32... at a...
process...
A uni...
on give...

an...
The...
models...

The mo...
combines a...
black high-res...
128K bytes of u...
a 1-million-byte f...
keyboard and me...
dard features yo...
on competitive...

competitive systems

See for yourself the personal computer our competition wishes had never been invented. The Advanced Personal Computer from NEC. Return the coupon to NEC Information Systems, Inc., 5 Militia Drive, Lexington, MA 02173.

**Now available
with NEC hard disk.**

CP/M-86 is a trademark of Digital Research, Inc.
MS-DOS is a trademark of Microsoft, Inc.

Send me more information on the
Advanced Personal Computer.

Address _____

City, State, Zip _____

Telephone _____

NEC

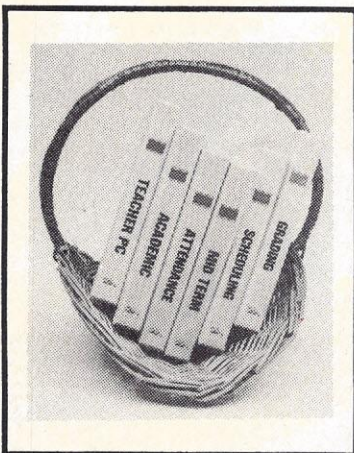
NEC Information Systems, Inc.

5 Militia Drive, Lexington, MA 02173

The Benchmark in World Class Computers

Fill Your Basket

With Educational Management Software



- ★ Attendance Management
- ★ Class Scheduling
- ★ Grade Reporting
- ★ Student Data Base
- ★ Deficiency Reporting
- ★ Computer Literacy

Apple II, Apple //e, Apple ///, IBM PC
TRS-80 I, TRS-80 III

Contact Your Local Dealer or CMA
(619) 365-9718



MICRO COMPUTER DIVISION
55722 SANTA FE TRAIL
Yucca Valley, Ca. 92284

CIRCLE 90

The cream of the personal computing crop
—3 new titles from Prentice-Hall cover the latest in personal computing topics.

UCSD Pascal Handbook: A Reference and Guidebook for Programmers

Randy Clark and Stephen Koehler, both of SofTech Microsystems, Inc.

Offers you the only complete and unified description of UCSD Pascal—especially appropriate for microcomputers, with full reference to the UCSD Pascal language and a programmer's guide. 1982, 356 pp., paper, \$15.95

Personal Computing with the UCSD p-System

Mark Overgaard, Stan Stringfellow, both of SofTech Microsystems, Inc.

A thorough introduction to the UCSD p-System, this new book addresses a topic not covered in most programming texts—the specific details of entering a program and preparing it for use. 1983, 400 pp., paper, \$16.95

Microcomputer Graphics

Donald Hearn, M. Pauline Baker, both of Western Illinois University

Provides you with a total introduction to microcomputer methods with thorough attention to special effects and three-dimensional graphics. 1983, 320 pp., paper, \$18.95

Examine any or all—free for 15 days. Write to Steven T. Landis, Prentice-Hall Book Distribution Center, Route 59 at Brook Hill Drive, West Nyack, NY, 10995. After 15 days, either send indicated price, plus shipping and handling or return books and owe nothing. Order 10 or more copies later and keep original as complimentary copy.

FOR FASTER SERVICE, DIAL TOLL FREE (800) 526-0485 9-4:30 (EST) (except AK, HI, or PR)

BOOKWARE™

CIRCLE 91

HARDWARE OF THE MONTH

\$250 CP/M Plus operating system, opening the door to one of the world's largest assemblages of professional software. The next logical expansion step would be to have your dealer install the expansion card cage (for about \$230) inside the Model 12, behind a panel fastened with thumbscrews. After that, most peripheral cards can be installed simply by opening the lid and plugging the card into the slot. Then you can add a memory card (from \$400 for the 64k card), which you need in order to run large CP/M programs. This is necessary because even though the machine has 80k of RAM, TRSDOS occupies 16k of that at all times, and CP/M Plus takes up more



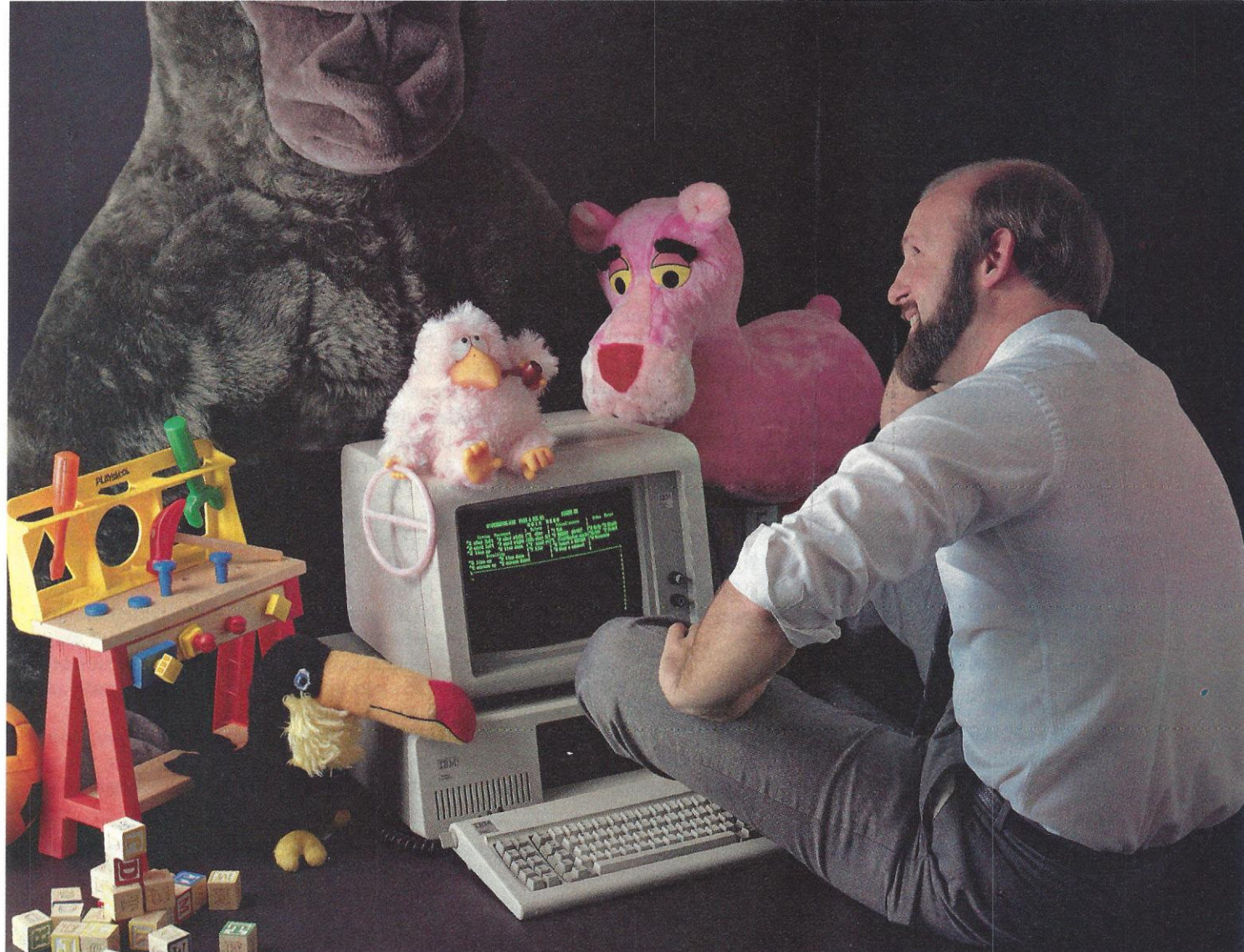
The Radio Shack Model 12 can be expanded into either a multi-computer network or a 16-bit multiuser system.

RAM than CP/M 2.2 did. So CP/M 2.2 applications software may run out of room unless you add RAM. The memory card also gives you huge VisiCalc files (running in TRSDOS).

Once the card cage is installed along with CP/M and some more RAM, the next logical step is the 12Mb hard disk drive for \$3500. Later you can plug as many as three more drives into the first, for \$2500 each. These drives don't mix with the older 8Mb units, by the way. The system can also be expanded to two internal and two external 8-inch floppies for up to 5Mb total storage. However, disk access time would be up to 10 times slower, and the ability to store very large files would be restricted to the 1.25Mb floppy unit.

A high-resolution graphics board that only works with the 8-bit processor is a further option at \$1500.

If you decide to expand to a 16-bit multiuser system, you start with the same basic system, then add the 16-bit processor and the 128k memory kit (\$1500 total). The memory board can be expanded to 256k with a \$500 memory set you can install yourself. Additional 128k boards cost \$700 and are expandable. The Model 12 can take up to 1Mb of RAM, though Radio Shack predicts most users will stop at two or three 256k boards and put the other expansion slots to different uses. Many users



This Programming professional deserves a lot more from his personal computer.

He's earned it. As a seasoned professional, he's learned to master some of the world's most advanced programming tools. Tools specially designed to meet the everyday demands of programming experts.

But as the owner of a personal computer, he's come to expect less. Less performance. Less sophistication. And less flexibility.

Why should programming a personal computer be any different?

Prior to the announcement of micro/SPF™ development software, experienced programmers felt programming a personal computer was a lot like playing with a toy. You couldn't take it seriously.

But today, there's micro/SPF™, a solution to elementary program editing tools now offered with most micro-computers.

With micro/SPF™ you get the same procedures and commands experienced programmers are accustomed to using at work. By mimicking features found in

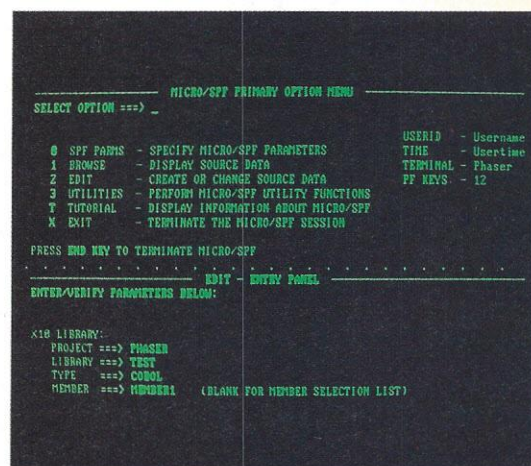
standard SPF software, micro/SPF™ provides all the sophisticated utilities programming professionals expect.

Programming experts can take advantage of skills they've spent years perfecting.

Now, for the first time, mainframe software is available for personal computers. SPF screens are fully reproduced in logical sequence and each screen is formatted identical to those found in the SPF system.

In addition, micro/SPF™ comes equipped with the same primary and line commands, tutorial messages and program editor (with program function keys) experienced programmers are used to.

Programming professionals who've spent years perfecting the art of writing sophisticated code deserve to work with state-of-the-art tools, not toys. Find out how micro/SPF™ can help you do work-compatible programming on your personal computer today!



PHASER

PHASER SYSTEMS, INC. 50 WEST BROKAW ROAD
SAN JOSE, CA 95110

HARDWARE OF THE MONTH

would get a hard disk or two at this point. Finally, you'd add two Radio Shack \$700 terminals. Such a setup, with the Xenix operating system, could run applications programs on the three workstations independent of each other. The terminals lack the Model 12's programmable function keys, so software may need to be able to use both function keys and control keys on such a system.

One benefit, of course, is that you can buy a Model 12 and defer choosing between these two courses of action until later, preserving your options. The Model 12 starts at \$3200 with one floppy drive and \$4000 with two.

FOR MORE INFORMATION: RADIO SHACK, 1800 One Tandy Center, Fort Worth, TX 76102, or contact your local Radio Shack store or computer center.

—Lee Thé, Associate Editor

TRACE SOUND TRAP FOR DOT-MATRIX PRINTERS REDUCES NOISE, HELPS ORGANIZE DESK

For many people, the single most annoying feature of personal computing is the sound of a dot-matrix print-

er at work. In the past, printer enclosures have cost almost as much as the printers themselves and have taken up as much space as all the other parts of the system put together. Now Trace, a Mountain View, Calif. engineering design firm, offers its Sound Trap as an affordable solution to the noise problem.

The Sound Trap wraps neatly around most 80-column dot-matrix printers. After you place the printer in the Sound Trap, you have to guide the power and connecting cable out through slots in the back, feed your paper in through the rear slot, and roll enough of it through the printer so the printout emerges from the same slot. This took us about 10 minutes, ignoring the illustrated manual and just doing what seemed reasonable. The stand plugs into four small slots in back which are all sound-insulated. It tilts the printer up at an angle of about 40 degrees, and its lid has a lip so you can put your work on it.

This is great ergonomically—you can place your work so you don't have to refocus your eyes whenever you go back and forth between your work and the screen. You

Announcing
PEN-PAL™
New efficiency in
word processors—
only \$59.95

PEN-PAL™ is the new word processor that maximizes your output. For home or business PEN-PAL gives you the flexibility you need to do all of your writing. From memos to manuscripts, from reports to recipes you produce professional results.

At \$59.95 PEN-PAL is your best buy. Functions found in more expensive word processors can be found in PEN-PAL — like:

- 5 help "menus" for display
- Horizontal scroll to 254 characters
- 40 and 80 column formatting
- Automatic page numbering and heading
- Centering and left and right justification
- Block copy moves, store and delete
- Global word search, replace and delete
- Accepts 16K RAM card to increase file storage
- 2 display modes (editing and formatting)

- Paddle controlled horizontal and vertical quick scrolling
- Takes advantage of Apple IIe® new features (upper/lower case, arrow keys, delete, etc.)

For efficiency, economy and performance buy PEN-PAL. Only \$59.95 at your local software retailer or call 800-428-3696 and reference Ad SW101. In Indiana call (317) 298-5400.

PEN-PAL, NO. 26115, \$59.95

Available for Apple II®, Apple IIe®, 48K, one disk drive.



SAMS BOOKS AND SOFTWARE

Howard W. Sams & CO., Inc.
4300 West 62nd Street, P.O. Box 7092
Indianapolis, Indiana 46206

Apple II and Apple IIe are trademarks of Apple Computer, Inc.

Sound Trap

might think it would all spill when you lifted the Sound Trap's lid to get at your printer's controls. Not so. Trace cleverly placed another lip at the top of the lid to keep your work from sliding off when you lift it up. Traditionalists can place the stand so the enclosed printer is horizontal, but this wastes space relative to the tilt-up position.

Does the Sound Trap work? You bet. That nasty clatter is dulled to a bearable rustle, and the paper feed works fine. In fact, the tilt stand leaves room behind and under the printer for a fair-size stack of paper. There's only one problem: If you have a smooth wall right behind the Sound Trap, noise emerging from the paper slot will bounce right back at you. You can solve this by not placing it close to a smooth wall, or by altering the acoustic reflectivity of the wall. You can achieve the latter with drapes or acoustic tile or foam.

Sound Trap costs \$129 with the stand, \$109 without. At that price, it should be possible to figure out a reasonable amortization schedule based on your increased productivity (i.e., being able to think straight while printing). And if you have a system at home, you may find a Sound Trap will make a considerable contribution to domestic tranquility.

FOR MORE INFORMATION: TRACE, 1928 Old Middlefield Way, Mountain View, CA 94043; (415) 964-3115.

CIRCLE 494

—Lee Thé, Associate Editor

INTEGRATED PORTABLE COMPUTER SYSTEM

Access Matrix Corporation has introduced Access, a portable computer system that integrates several peripherals into one unit.

The system includes a Z80 microprocessor; a high-speed dot-matrix printer; a direct-connect modular telephone jack and internal modem; a 7-inch amber monitor; two double-density, 5 $\frac{1}{4}$ -inch disk drives; a low profile, detachable keyboard; 64k of RAM; multiple I/O ports; storage compartment for 10 diskettes; and a leather case.

The built-in printer delivers hard copy at a rate of 80 characters per second. Users can print up to 132 characters per line on standard 8 $\frac{1}{2}$ -inch paper. The printer features a 96 ASCII character set, along with full graphic capabilities, and a program that allows various type styles to be printed.

Access can be configured for 110- or 220-volt operation. The optional internal battery pack is designed for total portability. This uninterruptible power source gives the user up to an hour of system operation and can be recharged from any household outlet or 12-volt battery. The retail price is \$2495.

FOR MORE INFORMATION: ACCESS MATRIX CORPORATION, 2159 Bering Dr., San Jose, CA 95131; (408) 263-3660.

CIRCLE 450

Introducing The Shrewd Modem



**automatic dialing,
300/1200 baud for \$599***

**Bell 103/113/212A compatible
Full or half duplex (local echo)
Phone line audio monitor
Complete self-test system
Two-year warranty**

Our newest modem is based on just three USR-designed microprocessors—by far the lowest parts count of any 212A modem available. Its resulting simplicity promises two major benefits. The first is outstanding reliability—that not only stands to reason, it's backed by a two-year warranty. The second is a cost low enough to inspire skepticism. Be skeptical; shrewd comparisons may save you as much as \$100. The shrewd modem. If it's not at your dealer's yet, write or call for complete specifications.

1053

*Suggested list for model 212A Auto Dial, quantity one.

**I would like additional information
on USR modems by ☐ mail ☐ phone.**

Name

Company Name

Street Phone

City State Zip

1053



U.S. ROBOTICS INC.

1123 WEST WASHINGTON BOULEVARD
CHICAGO, ILLINOIS 60607 [312] 733-0497

CIRCLE 83

May 1983 PERSONAL COMPUTING 179

IF YOU'RE CONFUSED PERSONAL COMPUTER,

At this moment, there are no less than 50 personal computers on the market. And more are being introduced every day.

On one hand, having all those options is a good thing. On the other, it can make picking the right one pretty difficult.



*Computers come in two parts.
You have to buy both.*

We'd like to help. So here are a few suggestions about how to buy the computer that's right for you.

Computers come in two parts.

One part is the "hardware," which is the machinery itself. The other is the "software," or a program, as it's sometimes called.

Software is the part that tells the computer what to do, the way a driver tells a car what to do.

Without software, a computer can't do anything.

And vice versa.

You have to buy both.

Buy the software first.

Since the reason you're buying a computer is to get the capability the software gives you (remember, it's the software that knows how to get things done), it makes good sense to pick the software first.

Start by making a list of the things you want to use the computer for. It can include almost anything—any kind of inventory, filing, accounting, graphics, reporting, record-keeping, analysis—you name it and there's probably a software program that does it.

Next, take the list into a computer store and ask the salesperson to give you a demonstration of the program, or programs, that will do the things you want.

Even though you'll need a computer for the software demonstration,

keep in mind the computer is just a vehicle. The software is the driver. And once you've decided on the software, picking out the rest of the computer system will be much easier.

The simpler the better.

Look for software that's easy to learn, easy to use, and that does the job in the simplest way possible.

Good personal software should be, as the computer people say, "friendly." Meaning that it helps you do what you have to do without getting in the way.



Meaning there are no complicated routines to follow to perform a simple task. And no programming language to learn.

Some people, however, will tell you that software has to be complicated to be powerful.

Nothing could be farther from the truth.

Because in order for a program to appear simple to you on the outside, it has to be extremely complex on the inside.

ABOUT BUYING A HERE'S SOME HELP.

Good software keeps the complications in the computer, where they belong. And keeps the capability at your fingertips. It's that simple.

You simply have to see for yourself.

You can read any number of interesting books and magazines about personal computers. You can ask friends who have them. You can look at all the sales literature you can get your hands on. And you should do all those things before you decide to buy.

But as helpful as all that can be, there really is no substitute for a real, live demonstration.

When you do go out shopping, we recommend you take a look at the PFS® Family of Software.

The PFS family is designed the way we think all software should be: simple, straightforward and powerful.

Currently, three products make up the family. PFS:FILE, PFS:REPORT and PFS:GRAPH, with more programs on the way. Here's a little more about each of them.

PFS:FILE. The simplest way to get organized.

Basically, FILE works like a paper filing system, without the paper. So you can record, file, retrieve and review information in a fraction of the time it takes with a conventional filing system.

FILE lets you arrange your information in "forms" you design yourself. So you can get at and really use your information in ways never before possible.

What's more, FILE lets you change the original form without having to redo the information on it.

PFS:REPORT. Making the most of your information.

REPORT summarizes the information on your forms so you can use it to analyze, plan and make better-informed decisions.

With REPORT, you get presentation-quality reports—sorted, calculated, formatted and printed—automatically, in seconds.

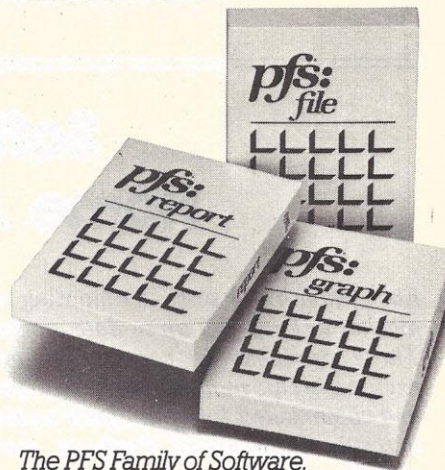
PFS:GRAPH. Instant pictures.

GRAPH gives you presentation quality bar charts, line graphs, and pie charts, in black and white or color, on paper or the computer screen. To get a clearer picture of things and spot trends instantly, you simply enter your information and specify the kind of graph or chart you want. GRAPH does the rest.

You can also mix and match line and bar graphs, or even stack or compare up to four bar graphs simultaneously.

And GRAPH will work with PFS:FILE, VisiCalc® files, or data entered directly into the computer.

Best of all, compared to the cost of hand-drawn graphics, GRAPH can save you enough money over the course of a few months to pay for the computer it runs on.



*The PFS Family of Software.
Simple and powerful.*

Send for our Free PFS SOFTWARE CATALOG.

It'll tell you more about the PFS Family of Software and how to use it.

It's free. And all you have to do to get one is return the coupon below, or see your participating PFS dealer.

The PFS Family of Software. We've already made computers simpler to use.

Now we're making them simpler to buy.

pfs:

FREE PFS SOFTWARE CATALOG



Name _____

Address _____

City _____

State _____ Zip _____

I plan to use a personal computer:

☐ at home ☐ at work ☐ both.

Mail to: PFS, 422 Aldo, Santa Clara, CA 95050

PER 5/83

*PFS is a registered trademark of Software Publishing Corporation, 1901 Landings Drive, Mountain View, CA 94043. The PFS Family of Software currently runs on the Apple® II, Apple III and the IBM Personal Computer® and equivalents. *Apple is a registered trademark of Apple Computer, Inc. *IBM Personal Computer is a registered trademark of IBM Corp. *VisiCalc is a registered trademark of VisiCorp Personal Software.

ons

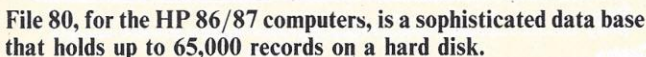
row of command designations marching across the bottom of your screen, just above the row of matching function keys. As you move from function to function (editing to printing, file "card" creation to search mode), the key designations change. So in effect you get more than seven function keys. This is much more flexible than systems with the function keys clustered to one side, a configuration which prevents easy on-screen labeling. It also works better than plastic function key designation strips slid into keyboard slots, because those don't allow the designations to change as you move around in your program.

File/80 lets you create data bases, starting with designing the forms you want to use. You have the flexibility to update records, restructure files without having to re-enter the data, do multicondition searches, and sort outputs. Results can be printed, stored on disk, or displayed on-screen. The report generation enables you to print out whole data bases, do averages, subtotals, grand totals, mini/max values, and four-function calculations.

Your data bases can hold up to 65,000 records. Each record can be up to 80 columns wide and 60 lines long. Reports can be formatted up to 132 columns wide. Each record can contain up to 100 informational categories, and each of these items can comprise up to 1028 characters. A single floppy disk can hold a data base of around 1000 200-character records. If you use the Hewlett-Packard 5Mb hard disk drive for storage, you can store from 857 to 65,000 records, with up to 76 characters of headings and 5828 characters of data in each record. A form letter format allows letters as big as the maximum record: 80 columns by 60 lines. The program can also generate labels.

Setting up a data base with File/80 is straightforward. First you make backup copies of all five program diskettes (roughly, 1: creating forms/records; 2: editing; 3: printing; 4: disk utilities; and 5: a demonstration disk). Once you've been through the demonstration disk, you're ready to start building your first data base.

Data-base programs tend to be either freeform or fill-in types. Freeform data bases are easy to create, as the name implies, but they limit your ability to sort your data later on. Fill-in types require you to create a master form for each data base, but allow you to sort your output later on. It's also simple to enter data into any given record thereafter, and to review records, since you've entered the data in an organized fashion. You can change forms later on without having to re-enter data.



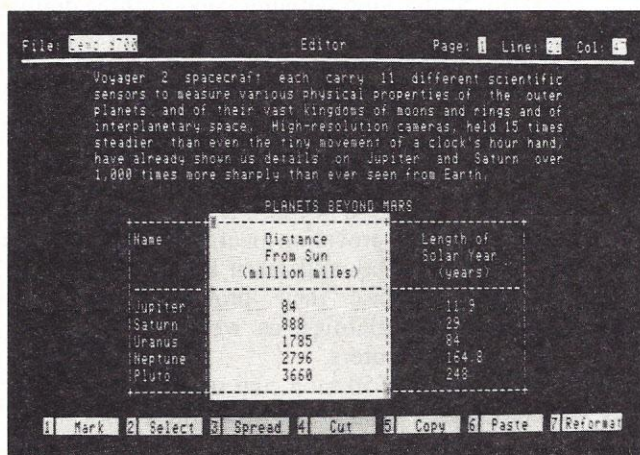
fessional performance. The idea was to provide 80 percent of the performance of the most sophisticated programs, at 20 percent of the difficulty. This philosophy becomes evident as soon as you load either program into memory, because Word/80 and File/80 both make use of the HP's seven programmable function keys.

Any time you're using Word/80 or File/80 you'll see a

Searches, sorts, editing, and printing are all simple to control from the bottom-of-screen menus. Searches allow you to specify the degree of precision you want, and a variety of conditions—things like “greater-than,” “less-than-or-equal-to.” Printing is simple because everything is preconfigured—the Epson-derived printer carries the HP nameplate and works right out of the box. Once you’ve learned the system, a 27-page pocket guide is really all you need for reference.

Word/80, File/80’s companion (though file-incompatible) program, has some outstanding virtues of its own. The dynamic function key labeling makes it easy to create and edit text.

File size goes up to 170 pages of text in memory, because Word/80 can address the HP 86/87’s considerable memory expansion capability. Each disk can hold up to



Word 80, because it can address the HP 86/87’s significant memory expansion, can store 170 pages of text in RAM.

about 85 pages of text. Graphics—one of Hewlett-Packard’s hallmarks—shows up here: You can merge charts and graphs into text. This function requires installation of a plotter ROM in your computer. Also, on-screen text justification lets you preview your printed output.

You can format text in two ways. While you’re editing text, you can imbed any of 46 commands to control print output, or you can go through a menu-driven process in the format module to organize your text for printing. People who write a lot prefer imbedded commands (like .pp—format a standard paragraph block), because they allow heavy editing without requiring text reformatting every time a change is made. They also let you set up formats for form letters and the like, so you can do word processing without having to reinvent the wheel each time.

Word/80 and File/80 both allow very sophisticated use. Fortunately for beginners, their integration with the

hardware and on-screen menus allows newcomers to write and file without having to master all the computing jargon beforehand. HP also offers single-vendor responsibility to a degree that’s rare with personal computers. And if you get really bogged down, HP is instituting user hotlines during business hours to get you over the humps.

Word/80 and File/80 each cost \$250. Hewlett-Packard has also been offering the two packages bundled with other software at a discount price.

FOR MORE INFORMATION: HEWLETT-PACKARD, 1820 Embarcadero Rd., Palo Alto, CA 94303.

CIRCLE 375, 334

—Lee The, Associate Editor

WORD PROCESSOR FOR ATARI 400, 800 AND 1200XL

Atari computers have suffered from an image of being a little more than upgraded games machines. But looking at Atari’s current software lineup, the image would appear to be undeserved. There’s VisiCalc, Family Finances, Home Filing Manager, The Bookkeeper, Time-wise (an appointment calendar), Telelink II (for accessing data bases, Microsoft BASIC and a greatly enhanced Atari BASIC. And now there’s AtariWriter, a fine word processor.

AtariWriter comes in an inexpensive solid state ROM cartridge. It stores its text on disk or on tape. With the entire program in ROM, AtariWriter allows you to create files up to the limits of your Atari’s RAM. For instance, with 16k RAM you can write and edit files up to a little over a single-spaced page long. With a 48k Atari you can work with files that translate into as many as five or six single-spaced pages.

Separate files can be linked for printing. The formatting commands let you do pagination, double-column printing, headers and footers, right and left justification, centering, subscripts and superscripts, and select from a variety of fonts.

AtariWriter is simple to master. Put the main diskette in the disk drive, turn on everything but the computer, put the AtariWriter ROM cartridge in its slot, and then turn on the computer. Now you will have the AtariWriter command menu on the screen, telling you all the things you can do in AtariWriter and which command key to press. The menu includes formatting options to store text, and options to create, edit, delete, load, save and print files.

When you’re in the edit mode, you will see a nearly blank screen framed by some information along the top and bottom. The string of letters and numbers across the top indicates the default values for file formatting and printing. At least at the beginning, you don’t need to know how to decipher or change those settings. Across the bot-

tom are tab-setting markers and indicators telling you the line and row occupied by your cursor at the moment.

Now just start typing as if you were at a typewriter. You'll notice that your wordstream is automatically "wrapped," at the 40-character margin, to the next line. You hit RETURN only to mark the end of a paragraph. When you are finished writing, hit ESC to return to the menu, then S to save or P to print your output.

One excellent feature of AtariWriter is that it allows you to see what your printed copy will look like by using a preview command. While you edit on a 40-column screen, the preview shows you up to a 132-column output, depending on how your printout is formatted. The trick is that you only see part of the full display—40 columns at any one time. The cursor control keys let you move the 40-column "window" rapidly over the copy.

The Atari 800 and 1200 keyboards have good-quality keyboards that permit you to enter the text rapidly. Unlike some expensive computing systems, you'll never get ahead of the display as you type. For sophisticated editing it lets you move up to about 30 lines of text from one place in the copy to another. But there is a drawback to this function—if you try to move more than 30 lines, AtariWriter will lose the "excess." Another inconvenience of the program is that new text can only be entered in the insert command level. You can't just over-write text you want to delete; you have to delete it with a separate step.

AtariWriter costs \$100. A word processing system complete with the Atari 800 computer, disk drive and dot matrix printer is priced at \$1927.

FOR MORE INFORMATION: ATARI INC., 1265 Borregas Dr., Sunnyvale, CA 94086.

CIRCLE 376

—Lee Thé, Associate Editor

FOUR EDUCATIONAL GAMES

The Children's Television Workshop, the developers of Sesame Street, have created the Children's Computer Workshop to develop and market high-quality educational software for kids. Apple Computer is now selling four disks that contain 18 of the most popular educational games to come out of the Workshop's efforts.

The four diskettes are age-rated as follows: Spotlight (9-13); Instant Zoo (7-10); Ernie's Quiz (4-7); and Mix and Match—for all ages. Each diskette contains four or five different games. Three of the games require game paddles. Several won't work unless you have a color display. To run all the games, your Apple should have both Integer BASIC and Applesoft languages.

Each diskette comes with a backup disk and an instruction booklet. Besides containing full directions for using the games, the booklets contain suggestions for collateral activities parents and kids can do that are related to what the child has learned. For instance, "Guess Who"

shows a dotted pattern on-screen that gradually resolves into one of the Sesame Street muppets. The challenge is to see how soon you can identify the character. One recommended collateral activity is to tell your child to inspect the images in the Sunday comics with a magnifying glass, and learn about the lithographic dots comprising those images. The child is also encouraged to draw some pictures with dots instead of lines.

The games themselves span a wide range of activities. In "Reflect" the game paddle controls the angle of an on-screen mirror. When you have it aimed where you want it, you push the game paddle button and a spotlight bounces a beam of light off the mirror. If it hits a target (there are quite a few), you win.

The most mature games include a simplified version of GO/Othello-type games, and a logic puzzle called "Hot Stuff." In "Hot Stuff," the computer chooses three digits. You guess which ones they are, and the computer tells you when you guess any of them correctly. But it doesn't tell you which one. Adults will find it interesting to see if they can get the numbers right with the fewest number of guesses, and even kids younger than the stipulated 9-13 age range will enjoy this game with adult help.

And that's the key to a lot of these games. They're participatory activities, providing an effective way for you and your children to play and learn together. You can help your kids exercise their problem-solving and memory-development abilities, as well as make them comfortable with computers.

The game disks cost \$50 each, and run on the Apple II Plus and the Apple //e. Most of the games work on an Apple /// in Apple II emulation mode as well. If you want to start with just one disk, you might consider Mix and Match. It doesn't need game paddles and can be enjoyed by anyone out of diapers.

FOR MORE INFORMATION: CHILDREN'S TELEVISION WORKSHOP, 1 Lincoln Plaza, New York, NY 10023; (212) 595-3456.

CIRCLE 383

—Lee Thé, Associate Editor

WORD-PROCESSING PROGRAM IS FAST AND EASY TO LEARN

Bank Street Writer is one of those rare programs that's equally suited to home or business use. The program is easy to learn and is capable of producing anything from a memo to a book.

One important feature of BSW is its ability to store text in binary files which are easily read by other Apple word-processing programs. As a matter of fact, this report was written with BSW and sent over the phone lines via modem to *Personal Computing's* home office across the country where it was edited using another word-processing program.

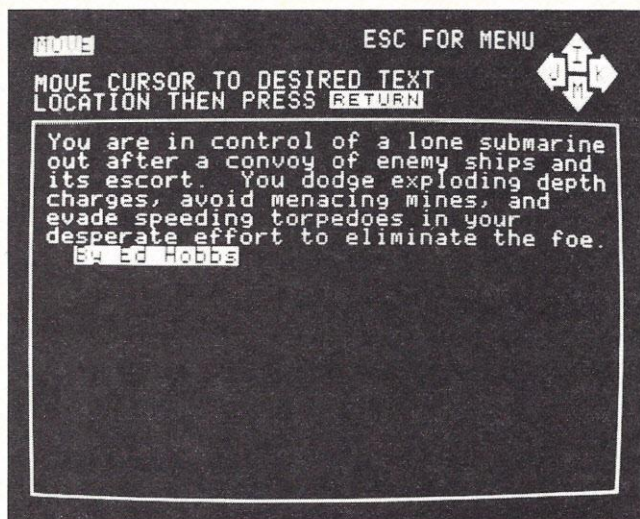
BSW boots in less than 15 seconds and uses standard

initialized disks. Files can hold up to 1300 words on a 48k Apple; 3200 words using a 64k system. Longer text can be broken into small files and linked for printing.

Text appears in a 40-character by 18-line edit window, with software-generated upper- and lowercase characters. BSW automatically configures itself to either the Apple //e or Apple II Plus keyboards.

Commands are displayed above the text window, along with a submenu of instructions. The menu includes text entry and deletion, cursor movement in four directions, search and replace, save and retrieve, and draft and formatted printing. Some of the more critical commands (like deleting disk files) are buffered, which means BSW queries the command before executing it.

The program also allows the user to indent and center text, move the cursor in 12-line blocks, and to see how much space is left in memory. The utilities program (en-



Editing commands appear above Bank Street Writer's 40-character by 80-line edit window.

gaged by hitting ESCAPE during booting) lets the user convert binary files into sequential text files and vice versa. It can reconfigure BSW default settings for hardware setup and printing parameters, engage or disengage the audible keyclick function, and catalog files and passwords.

The trickiest part of BSW is getting used to the program's 40-column display. Since your text is printed in 80-column format, what you see on the screen isn't exactly what you get on paper. On the other hand the display is brighter and more legible than some 80-column displays. You can also use a television as a monitor.

Users should delight in BSW's speed—no matter how fast you type, you won't get ahead of the display. Automatic word wrap lets you type without hitting RETURN,



MILLIONAIRE THE STOCK MARKET SIMULATION™

Software for Mature Audiences

An adventure that throws you into reality.

MILLIONAIRE™. The Stock Market Simulation™ is a game unlike any you've played before. The time is now. The place is Wall Street and the world is changing rapidly. You make the decisions. Move carefully, your fortune depends on it.

MILLIONAIRE™, The Stock Market Simulation, a computer experience so real you may not be ready for it. Because MILLIONAIRE™, gives both the novice and the expert alike the chance to find out how good they really are and how it feels to live in the financial fast lane.

A built in program generator allows you to command your computer to create an entirely new game. So there is no added cost for new scenarios.

If you haven't played MILLIONAIRE™ you're in for an education. It's the adventure in reality that you've been waiting for!

Available at finer computer and software stores or may be purchased directly from Blue Chip Software.



BLUE CHIP SOFTWARE

19824 Ventura Blvd. #125
Woodland Hills, CA 91364
800 835-2246 ext. 234

Dealer & Distributors (213) 881-8288

CIRCLE 95

SOFTWARE OF THE MONTH

except at the end of a paragraph. Some of the other functions—deleting blocks of text, for instance—aren't as fast as other word processors.

The package sells for about \$70, which is a good price considering the sophisticated programming required to give BSW its speed and a disk-based tutorial. Versions exist for the Apple //e and the Apple II Plus. The Atari version may be available soon and Commodore 64 and VIC-20 versions are in the works.

FOR MORE INFORMATION: BRODERBUND SOFTWARE, 1938 Fourth St., San Rafael, CA 94901; (415) 456-6424.
CIRCLE 225

—Lee Thé, Associate Editor

REVISED COMMERCIAL PROPERTY MANAGEMENT SYSTEM

Solid Software has recently expanded its Commercial Property Management System to include consolidated financial statements. This system is now totally integrable with Solid Software's general ledger, payroll, and accounts payable systems.

Consolidated financial statements can provide landlords or property managers with a property management system that handles financial statements for all the properties they manage. This new system also calculates late fees. Fees can either be calculated manually by each tenant each month, or a fixed fee may be assigned and automatically processed every month.

Ease of use is a feature of the new package. Property numbers need only be entered once, and escape functions allow the user to move out of data entry areas quickly.

The Commercial Property Management System runs under CP/M and MS-DOS. It sells for \$1495 and is available from some 300 dealers across the country.

FOR MORE INFORMATION: SOLID SOFTWARE, 5500 Interstate North Parkway, Suite 501, Atlanta, GA 30328; (404) 952-7709.
CIRCLE 315

GRAPHICS PACKAGE OFFERS FLEXIBILITY IN CHART CONSTRUCTION

Mirrorgraph, a menu-driven graphics package, is designed primarily for users with little or no programming experience, but is sophisticated enough to handle numerical analysis. The system allows users to construct bar graphs, pie charts, and multiple line graphs from raw data.

Bar graphs created with Mirrorgraph can handle six entries. Each entry is proportioned to a scale displayed across the bottom of the screen and appears horizontally across the screen, labeled with a user-specified title and value. Chart headings and explanations for each axis are also supplied.

The package allows users to represent numerical data in a pie chart format. The pie can have up to 20 colored

slices, each displayed as a percentage of the whole. Mirrorgraph will automatically print the name and percentage value of each slice.

The line graph feature allows users to draw up to four curves on a single set of axes with this package. Each curve is represented by a character and color reflected in the key at the bottom of the chart. Mirrorgraph adjusts the scale of the axes to correspond to the data supplied.

Each curve of the line graph can show as many as 100 data points which are represented either as a series of points or as continuous lines. These graphs may be displayed with or without a background grid.

Mirrorgraph can show 13 months of data on a single graph, allowing users to prepare annual reports and present yearly statistical data in a simplified, readable form.

All graph-construction routines include an audiovisual error-checking system for easy changes. Graphs can be stored on disk or printed out on a dot-matrix printer.

Mirrorgraph requires an IBM Personal Computer with 64k, a double-sided floppy disk drive, and a color-graphics adaptor. A color monitor and a dot-matrix printer are recommended.

Mirrorgraph retails for \$59.95.

FOR MORE INFORMATION: MIRROR IMAGES SOFTWARE INC., 1223 Peoples Ave., Troy, NY 12180; (518) 274-2335.
CIRCLE 365

PORTFOLIO MANAGEMENT FOR THE APPLE II AND //E

Micro PMS from The Boston Company is a portfolio management system with templates for entry of buy, sell, and income transactions. It includes portfolio appraisal reports and has the capability to design reports in the user's own format. In addition to the investment software, the user receives monthly data disks covering 1500 popular stocks. Security prices can also be updated manually from the Dow Jones News/Retrieval Service.

According to The Boston Company, Micro PMS uses performance measurement techniques recognized as state of the art by leading institutional investors. The company invites comparison of its investment performance with any of the popular market indices.

The monthly data disks contain the latest stock prices, and also give earnings, dividend, growth, valuation, quality, and risk ratings. There are more than 40 data items available for each of 1500 stocks. The user receives updated stock data disks at the beginning of every month.

Micro PMS also features portfolio analysis which can be used to learn more about portfolio strategy and structure. Micro PMS displays a portfolio's percentage breakdown by economic sectors, growth rate, or any of the data items given for each stock.

A portfolio enhancer will compare a given portfolio with targets appropriate for the investor's objectives, and suggest possible trades to improve position. An investor then evaluates "what-if" buys and sells to determine the effect on a portfolio.

Micro PMS runs on an Apple II or //e with 64k of RAM and two disk drives. Optional hardware includes a printer, a telephone modem, and an 80-column card. For \$595 the user gets all the software, a user's guide, and a 12-month subscription to monthly stock data disk updates.

FOR MORE INFORMATION: THE BOSTON COMPANY, One Boston Place, Boston, MA 02106; (617) 722-7939. CIRCLE 363

YEAR ROUND TAX PLANNING PACKAGE FEATURES BOTH GRAPH AND REPORT FORMATS

Tax Decisions, the latest addition to Eagle Software's "All Pro Series" of business software, is a tax planning

package designed to assist tax professionals in formulating effective tax plans.

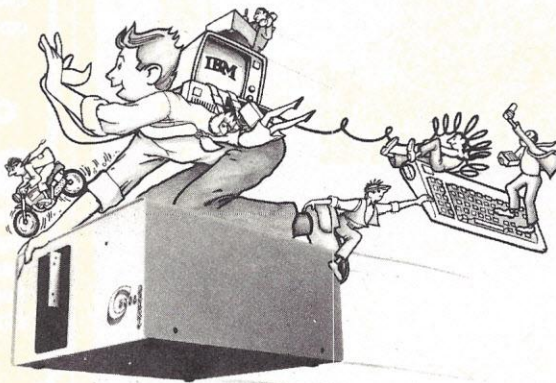
To help users analyze various tax plans, Tax Decisions displays key lines of Form 1040 in both graph and report format. Each graph and comparative report illustrates a client's liability calculated in a single plan, or displays a detailed comparison of all available plans.

"Because it is a tax planning software product, Tax Decisions is much more than just a 'seasonal' program that calculates your Form 1040," says Eagle president Terry Wright. "Instead, it is a year-round strategy tool designed to formulate as many as 60 separate tax plans using all the necessary Form 1040 entries, as well as 16 supporting schedules and forms."

To protect users from changes in tax legislation, update programs are also provided free of charge for one year from date of purchase. The price of the package is \$229.

FOR MORE INFORMATION: EAGLE SOFTWARE PUBLISHING INC., The Woods, Suite 409, 993 Old Eagle School Rd., Wayne, PA 19087; (215) 964-8660. CIRCLE 555

Performance Breakthrough...



... the CYBERDRIVE™ for the IBM Personal Computer

13.5 or 27 million bytes of disk capacity in a single cabinet with an integrated mini-cartridge tape for secure data backup.

Setting an exciting new microcomputer standard, the CYBERDRIVE combines a full package of features.

It offers new, higher performance levels, with an integrated business-oriented backup device.

As the CYBERDRIVE is made available for other systems, media transfer is assured regardless of the host hardware or Operating System.

The CYBERDRIVE slashes the seek time dramatically—e.g. the usual 5 Megabyte stepper-motor Winchester disk offers average seek time typically in the range of 100 to 200 milliseconds (incl. head settling).

With the CYBERDRIVE, the average seek time across more than five times as much data is only 33 milliseconds (incl. head settling).

This basic speed, coupled with disk cache buffering and a peak transfer rate of 1 million bytes per second, make the CYBERDRIVE a performance champ!

Trademarks of: 1 - Cybernetics, Inc. 2 - Ryan-McFarland Corp.
3 - Micro Business Software, Inc. 4 - Mini-Computer Business Applications, Inc.
5 - Digital Research, Inc. 6 - Phase One Systems, Inc. 7 - Bell Laboratories

© Copyright 1982 by Cybernetics Inc. All rights reserved.
Prices and specifications subject to change without notice.

The integrated mini-cartridge tapes used for backup of data allow dumping of (for example) 10 million bytes of data in about 10 minutes... much faster than other tape or floppy disk backup techniques. Hardware read-after-write error checking is incorporated in the tape device.

... And don't fail to ask about our superb lineup of serious business software (also offered in CYBERDRIVE format) including:

RM/COBOL² compiler—the micro industry standard.

MBSI³ RM/COBOL general business applications (derived from **MCBA⁴** minicomputer packages)... thousands in use... money back guarantee... source program license.

CRT!¹ from Cybernetics (COBOL Reprogramming Tool!)—Program Generator for **RM/COBOL** to ease program development and maintenance... an alternative to a Data Base system.

CBASIC²⁵ & CBASIC⁸⁶⁵ compilers... for aficionados of a useful BASIC.

The software is available on a variety of industry-standard Operating Systems including CP/M⁵ - MP/M⁵ (both -80 & -86), OASIS⁶, PC DOS, and UNIX⁷. Inquire for specific details and prices.



8041 NEWMAN AVE., SUITE 208
HUNTINGTON BEACH, CA 92647
714/848-1922

Put your micro on IBM's level...

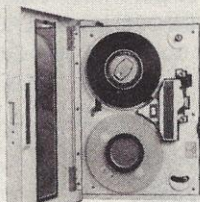
Now you can communicate with the IBM world with Innovative Data Technology's 1/2" magnetic tape peripherals.

Popular configurations and optimum performance for most small systems that feature IBM compatibility and provide a large, cost-effective, back-up and storage capability.

The TD-1012 series 9-track PE (1600 cpi) magnetic, start-stop, tape subsystems are available in either vertical, horizontal or desk-top mounting. The TD-1012 incorporates industry-standard interfaces and provides high-speed data transfer (up to 20K bytes per second) in start/stop applications.

IDT's TD-1050 series tape systems support a variety of host interfaces and permit data transfer rates up to 50K bytes per second. Available in 21 separate models, the series TD-1050 tape transports utilize reels up to 10 1/2" at 18.75 to 45 ips, 9-track PE (1600 cpi) and/or NRZI (800 cpi).

Open the window on the IBM universe today with a magnetic tape subsystem from Innovative Data Technology: Where innovation puts you ahead.



TD-1012-1
Tape Subsystem



TRS-80



IBM PC



APPLE II or III

All IDT subsystems come complete and include tape transport, formatter, intelligent controller, computer resident coupler, cables, documentation and software.

O.E.M., dealer/distributor discounts available.



INNOVATIVE
DATA
TECHNOLOGY

4060 Morena Blvd. • San Diego, CA 92117
(619) 270-3990 • TWX: (910) 335-1610

Eastern Regional Office:
P.O. Box 1093 • McLean, VA 22101-1093
(703) 821-1101 • TWX: (710) 833-9888

IBM is a trademark of International Business Machines Corp.
Apple is a trademark of Apple Computer Inc.
TRS-80 is a trademark of the Tandy Corporation.

COMING IN FUTURE ISSUES

Getting Time On Your Side

A time-management program can be a valuable tool for the manager or executive with an active schedule. Time-management packages for use on personal computers can help the user set priorities, schedule (and keep) appointments, and coordinate the activities of department personnel. Find out what packages are available and what they can do for you in the June issue of *Personal Computing*.

Video Game Buyer's Guide

Video game sales are bigger than ever, and so is the selection of games available. Games of adventure, fantasy, and action come in a wide range of skill levels, graphic sophistication, and price. See what's new in the video game market in our Buyer's Guide to Adventure Games in the June issue of *Personal Computing*.

Thinking Computers

As a researcher in artificial intelligence at Yale University, Natalie Dehn is trying to forecast the effects of the computer revolution on human thought processes. In an interview with *Personal Computing*, she discusses her work and offers her observations on how computers are changing the way people think.

Computer Typesetting By Telephone

Businesses can cut typesetting costs by transmitting material directly to the typesetter through a word processor and telephone modem. This method can reduce input costs and turnaround time while still providing the benefits of professional typesetting and printing. Read how to set up such a system in the June issue of *Personal Computing*.

Can Two Computers Live As Cheaply As One?

As members of the family compete for time on the home computer, many people are considering buying a second computer for home use. What should you look for in a second computer? Can two computers share peripherals? Software? Find out in the July issue of *Personal Computing*.

Buyer's Guide To Computer Furniture

As technological advances bring us more sophisticated computers, computer furniture manufacturers are responding with innovative, ergonomically designed furniture to support and enhance the new hardware. For a full report on computer furniture, see the special Buyer's Guide in the September issue of *Personal Computing*.

ACCOUNTANT/CLIENT WRITE-UP PACKAGE

Starsoft has introduced CPApartner, a client write-up and billing system for small- to medium-size accounting firms. The package contains two modules—one for time management and billing, and one for client write-ups.

Both modules offer system setup parameters for a variety of peripherals, allowing the user to customize. The time management and billing module includes monthly and year-to-date summary reports. The client write-up module lets the user post client journal entries and produces a set of financial statements. It also includes a file that saves chart categories, statement headings, and lists of clients.

CPApartner can manage and schedule 500 clients, handling up to 4500 monthly journal entries per client. If the user's computer has an internal clock card, the program will track time spent updating each client's records and list the proper charges.

CPApartner has several special features. The user can obtain revenue analysis by skill level, employee, and job type. A mailing list can be compiled with sort and select functions. This package will also spot mistakes. For example, unbalanced client entries cannot be posted, and account numbers with an existing balance cannot be deleted.

This program runs on an Apple II or Apple /// with floppy or hard disk drives. Starsoft recommends a hard disk drive, however, in order to speed up the billing process and to handle large client data bases.

The complete CPApartner retails for \$1295. The client write-up module is available separately for \$695.

Starsoft provides a toll-free number, and in-house CPAs and other accountants are available to answer financial and technical questions.

FOR MORE INFORMATION: STARSOFT, 4984 El Camino Real, Suite 125, Los Altos, CA 94022; (415) 965-8000.

CIRCLE 317

HEALTH CARE ACCOUNTING SYSTEM

Compupeg Software has a new entry in the vertical software market. The product is called Compupeg, and it's a pegboard accounting system for health care professionals. This package is designed to serve a one- to four-person practice with accounting functions such as receivables, aging of accounts, insurance forms, patient recall, and ledger accounting. The user can control all record keeping from the office.

Compupeg has two major components. One is Patient Accounts, which does transaction, recall, and billing. The other is General Ledger, which keeps track of paid and unpaid accounts, and gives daily, monthly, quarterly, or annual reports.

Compupeg uses the MicroSoft BASIC language, and

runs on the CP/M or MP/M operating system. The company suggests the IBM Personal Computer, Xerox 820, Vector Graphic, or California Computer Systems hardware. It recommends a hard-disk system, though Compupeg will fit a system with 64k internal memory using floppy disks. You can store 3000 patient accounts per megabyte, and accounts receivable has room for 30,000 accounts.

Compupeg Software offers a 45-day trial of this program. For \$50 the company will send the user programming and file space for 10 accounts. If this type of program fills his needs, he can send Compupeg the remaining balance of \$650 and receive programming with file space for 30,000 accounts. If Compupeg does not meet the user's needs, he can return the manual and disk for a refund of his initial \$50.

FOR MORE INFORMATION: COMPUPEG SOFTWARE SPECIALISTS, 1202 West Ridgeway, Waterloo, IA 50701; (319) 233-2816.

CIRCLE 227

VOCABULARY BUILDING FUN

Program Design Inc. has announced a four-cassette package called Vocabulary Building Games. The games are designed to provide entertainment while sharpening vocabulary, logic, and problem-solving skills. The computer chooses words at random, creating its own puzzles. This presents the player with thousands of different puzzles to solve.

There are four games in the package: AstroQuotes, Kross 'N Quotes, Minicrossword, and Time Bomb. The accompanying user's guide describes each game and how to use it. The guide also suggests supplementary activities for improving vocabulary skills.

In AstroQuotes, the player must guess four words from clues given by the computer. The player tries to use the information to guess a famous quotation. Quotes range from the philosophy of Aristotle to the humor of W. C. Fields.

Kross 'N Quotes presents the player with many scrambled letters. The object is to take letters from the bottom of the screen and put them into correct slots at the top of the screen. The letters form a well-known quotation. Speed is the key to this game—the easier the quote, the less time a player has to solve it.

In Minicrossword, the player must complete a crossword puzzle. The computer scores the player on how well he solved it. Wrong guesses and blanks count against the player.

Time Bomb is a computerized version of Hangman. The computer chooses the secret word, and the player is told the number of letters the word contains. If the player doesn't guess the word within the time limit, a bomb explodes.

Vocabulary Building Games is designed for the Atari

SOFTWARE OF THE MONTH

400 or 800 with 24k (a 16k version may also be available). The price for four cassettes, a user's guide, and a storage container is \$59.95. The games can also be purchased separately on cassette or disk. Cassette versions retail for \$16.95 each; disk versions are \$23.95 each.

FOR MORE INFORMATION: PROGRAM DESIGN INC., 95 East Putnam Ave., Greenwich, CT 06830; (203) 661-8799.

CIRCLE 553

TWO UTILITIES FOR APPLESOFT USERS

Micro-Sparc, Inc. is offering two new utilities for Applesoft BASIC users: MacroSoft and The Assembler.

Micro-Sparc terms its MacroSoft package "a new breakthrough approach to Applesoft BASIC programming." MacroSoft allows the user to write Applesoft-like programs which are converted directly into machine language. The company says this process results in programs that are up to 50 times faster than Applesoft, and up to 10 times faster than compiled Applesoft.



Protect your Diskettes!

This sharp looking Diskette Tray with hinged lid keeps diskettes handy and free from hazards that can create data dropout. Complete with plastic dividers and foam cushion bottom, it provides easy, warp-free storage. And, as with all Pryor products, if you aren't completely satisfied, return the merchandise within 30 days and we'll return your money.

PRYOR Computer Supplies Catalog

— PHONE TOLL FREE 800-558-6866, or send coupon —

Pryor Catalog Sales Corporation
8785 North Port Washington Road
P.O. Box 17829, Milwaukee, Wisconsin 53217

PC 483

Send _____ 5 1/4" Mini-Diskette Trays, Order No. 527-206 at \$29.95 ea. Total \$ _____
(Qty)

Send _____ 8" Diskette Trays, Order No. 527-209 at \$35.95 ea. Total \$ _____
(Qty)

☐ Check enclosed ☐ Bill me

☐ Please send a Free copy of the Pryor Computer and Word Processing Supplies Catalog

Name _____

Company _____

Address _____

City _____

State _____

Zip _____

Phone _____

Signature _____

CIRCLE 98

MacroSoft adds commands not included in Applesoft. Some of these commands are: IF-THEN-ELSE, REPEAT-UNTIL, BUTTON, SOUND, and WHILE-WHILEN. If a user knows advanced programming and assembly language, he has the added convenience of being able to mix assembly language and MacroSoft in the same program.

The package runs on the Apple II, II Plus, and //e, as well as Applesoft-compatible computers such as the Franklin ACE. It requires 48k of RAM, one disk drive, and The Assembler package.

The Assembler, a new assembly language for Applesoft-compatible systems, provides up to 29.5k more memory for source programs. This package can be used alone or as a companion program to MacroSoft. It has a global editor that includes features such as search and replace. With the Assembler, the user can write his own subroutines and call them by name. He can also produce a list of variable names, and their locations in his program.

A collection of macro commands that simulate the commands of other assemblers such as the Apple ToolKit is included in The Assembler. The combination of MacroSoft and The Assembler lets the user write BASIC programs that will run in machine language.

The Assembler requires Applesoft, DOS 3.3, one disk drive, and 48k of RAM. Alone, the program sells for \$69.95. The combined package with MacroSoft and The Assembler sells for \$99.95.

FOR MORE INFORMATION: MICRO-SPARC, P.O. Box 325, Lincoln, MA 01773; (617) 259-9710.

CIRCLE 421

GRAPHICS AND CALCULATION IN ONE PACKAGE

Desktop Computer Software has announced Graph 'n' Calc for the IBM Personal Computer. This business graphics system has a calculation feature and can be used as a decision support and display tool for both the novice and the experienced user.

Graph 'n' Calc provides statistical and financial functions such as multiple linear regressions, net present value, internal rate of return, and exponential smoothing. All functions are menu driven.

Because the IBM Personal Computer supports high-resolution color graphics, Graph 'n' Calc can be used to make detailed line charts, side-by-side and stacked bar charts, stock market charts, and a variety of labeled pie charts. The user can also organize charts for a slide show, and call up a series of charts on an elapsed time or individually keyed basis. Hard copy can be produced on Epson MX-series printers with the Graphtrax option, or with a Hewlett-Packard two-pen color graphics plotter.

Commands are entered with a single keystroke. The user can speed up input by using current value defaults

that assume numeric values common to many financial models. Menus are expansive, and if the user selects the wrong menu, he can exit by hitting the ESCAPE key.

Graph 'n' Calc requires a single drive IBM Personal Computer with 64k of RAM, and a monochrome or RGB color monitor. The price is \$199.95.

FOR MORE INFORMATION: DESKTOP COMPUTER SOFTWARE, 303 Potrero St., Santa Cruz, CA 95060; (408) 458-9095.
CIRCLE 340

TEXT MANAGEMENT SOFTWARE

FYI has introduced SUPERFILE System 3, a text management program for CP/M-based systems. This package lets the user update and reindex up to 65,000 records per data base. Each free format, variable length record can have as many as 500 of the user's key words for descriptors, with a maximum of 32,000 key words per data base.

With SUPERFILE System 3 the user can cross-index and retrieve records by linking 128 key words with "and,"

"or," and "not," and can search 255 floppies. SUPERFILE System 3 counts the times each key word occurs in the alphabetized key word listing. These key words can be itemized on the program disk, and the listing will tell the user on which disk the key word appears.

Included with SUPERFILE System 3 is a program called Post Haste, which allows the user to format and print mailing labels, envelopes, membership lists, directory listings, and other information retrieved from SUPERFILE System 3 searches. The program can sort alphabetically or by ZIP code. Post Haste, which can be purchased separately for \$95, can be used by itself or with MicroPro's MailMerge.

No programming is necessary to use SUPERFILE System 3. It requires CP/M 2.2 or IBM PC-DOS 1.1, and two disk drives or hard disk. The suggested retail price for SUPERFILE System 3 with Post Haste is \$295.

FOR MORE INFORMATION: FYI, INC., P.O. Box 26484, Austin, TX 78755; (512) 346-0133.

CIRCLE 371



COMPARE PRICES!

commodore VIC 20 \$139 	commodore PI28 128 K Home Computer CALL FOR PRICE	TEXAS INSTRUMENTS TI99/4A \$147 <small>*AFTER \$100 REBATE FROM TI</small>	ATARI 1200 CALL FOR PRICE 	TIMEX sincir 1000 \$75
ATARI 400 \$199 	commodore 8023P \$529 	commodore 64 CALL FOR PRICE 	TEXAS INSTRUMENTS TI99/2 CALL FOR PRICE 	AMDEK CORP Color I \$299
SMITH-CORONA TPI \$569 	NEC 8023 \$459 	EPSON FX80 CALL FOR PRICE 	OKIDATA M80 \$299 	OKIDATA M82 \$419

TOLL FREE 800-356-9514

(608)-271-6889 Weekdays 9-9 Saturdays 9-5

We Sell Every Major Brand of
Audio - Video - Home Computers



COD

WDS

WISCONSIN DISCOUNT SALES

2417 W. badger rd. madison, wi 53713

ADVERTISERS' INDEX

Many of *Personal Computing's* advertisers will send further information about their products and services. Simply circle (on the readers' service card) the bold number that appears to the left of the advertiser's name in the list below. If there is no number listed on the left, kindly write or call the advertiser.

Circle No.	Page No.	Circle No.	Page No.	Circle No.	Page No.
71	Aardvark.....173	55	Dysan Corp.....128	152	PC Software.....192-45
79	ABC Data Products.....164	86	Eagle Computer.....16	23	Percom Data Corp.....55
160	Ace Software Stores.....192-79		E. Arthur Brown.....192-82		Phaser Systems.....177
142	Advanced Computer Products.....192-38	212	E.G. Communications.....192-86	148	Pi-Tech.....192-54
184	Advanced Systems Concepts, Inc.....192-79	10	800 Software.....20	115	PMI Inc.....192-10
20	Alpha Byte Computer Products.....40	188, 31	Electronic Protection Devices.....192-15, 192-71	108	Practical Peripherals, Inc.....34
36	Altos Computer Systems.....15		Electronic Specialists, Inc.....192-57	91	Prentice Hall, Inc./College Div.....176
24	Amdek.....116	161	Epson America, Inc.....22	111	P.R.I.C.E.....192-6
43	Apple Computer, Inc.....6, 7	203	Excel.....192-84	186	Professional Business Forms.....192-81
154	Applied Computer Products, Inc.....192-49	194	Executive Data Systems.....192-80	124	Program Design, Inc.....192-22
	Applied Creative Technology.....29		Express Software.....192-83	178	Programmers Institute.....192-85
118	Applied Software Technology.....171	140	Figure-Logic Business Equipment.....192-36	153	Programming International.....192-46, 192-47
113	Archives.....192-5		Frederick E. Deeg & Assoc.....192-8	122	Proximity Devices.....192-19
192	Artificial Intelligence.....192-80	136	Garden of Eden.....192-31	98	Pryor Corp.....190
	Aspen Software.....192-2	42	General Electric.....110	46	Quadram.....18, 19
58	Barron's.....133	76	Harcourt Brace Jovanovich.....151	14	Quark, Inc.....26
129	BASF Systems.....196		Harmony Video.....192-74	64	Qume.....138, 139
105	Bausch & Lomb/Instr. & Syst. Div.....126		Harrison Computer Center.....192-32	19	Racal-Vadic.....38
201	Bit 3 Computer Corp.....192-82		Hayden Book Company.....213	34	Radio Shack.....79
95	Blue Chip.....185		Hayden Software Company.....94, 95, 208, 209 192-75, 192-76, 192-77, 192-78	44	Rana Systems.....32, 33
4	BRS.....9	4	Hayes Microcomputer Products.....8	80	RCA Service Company.....165
150	Cab-tec.....192-44	167	Hewitts Computer Shop.....192-48		Realdata.....192-68
169	The Casemaker.....192-62	62	Hewlett-Packard.....136-137	189	Redgate Publishing.....51
	Cdex Corp.....206	162	Horizons Unlimited.....192-58	190	Reference Magazine.....167
90	Charles Mann & Assoc.....176	66, 70, 92	Howard W. Sams & Co. Inc.....143, 148, 149, 178		RH Electronics.....192-12, 192-13
53, 54	CLOAD Magazine, Inc.....142	207	Huntley Enterprises.....192-84	27	Rixon.....68
101	Columbia Data Products.....198, 199	3	IBM Corp.....4	197	Run-It Software.....192-82
114	Columbia National General.....192-9	181	ICS Computer Training.....192-74	125	S-A Design Books.....192-23
89	Commodore.....C-4	185	I/O Management.....192-81		Scottsdale Systems, Ltd.....192-41
149	Communications Electronics.....192-51	112	Independent Investors Forum.....192-6	103	Selectone.....192-29
40	Compaq.....90		Infocom.....154, 155		Software Galore.....192-14
35	CompuServe.....10	120	Inmac.....192-17	149	Software Models.....192-36
123	CompuShack.....192-20, 192-21	96	Innovative Data Technology.....188	94	Software Publishing.....180, 181
116	Computer Apparatus.....192-11	78	Intel.....162, 163	170	Software Support.....192-63
128	Computer Case Co.....192-26	49	International Micro Systems.....119	187	Software Training Co.....192-87
93	Computer Discount of America.....192-10	156	International Users Group.....192-52	72	Source Telecomputing Co.....61
175	Computer Discount Products.....192-67	68	ITM.....157	21	Spectra Video, Inc.....42
61	Computer Entrepreneur.....135	211	Kopac Creations.....192-86	180	Spectrum.....192-88
47	Computerline.....118	163	Krell Software.....192-58	102	SpreadSoft.....192-50
179	Computer Mail Order.....192-72, 192-73	213	Lawrence Epstein Assoc.....192-86	33, 131, 132	SSM Microcomputer.....78, 192-26, 192-27
	Computer Outlet.....192-64, 192-65	106, 107	Leading Edge Products.....216, C-3	52	State of the Art.....17
110, 48	Computer Peripherals.....192-3, 192-33	191	Learning Well.....192-80	57	St. Martins Press.....132
174	The Computer Store.....192-66	25	Lotus Development Corp.....62	173	StorWare.....192-66
164	Computer Shopper.....192-68	198	Lyben Computer Systems.....192-82	50	Structured Systems Group.....124
38	Computer Super Stores.....86	139	Lycos Computers.....192-34, 192-35	158	Sunlock Sytems.....192-56
37	Computer Specialties.....84	69	Magic Computer.....147	135	Sutton Design.....192-30
165	Computer Warehouse.....192-59	82	Mannesmann Tally.....166	28	Systems Plus, Inc.....70
	Computronics.....114, 194	81	Master Electronics, Inc.....192-70	210	Tayco.....192-86
150	CompuWare.....192-44	134, 196	Maxell.....200	121	TCI Software.....192-18
	Compuway.....192-23		McGraw-Hill Book Co.....49	202	Tech Data.....192-82
41	Condor Computer Corp.....108, 109	141	Megabyte Industries.....192-30, 192-80	77	Tech-Sketch.....159
65	Consolink Corp.....141	197	Memory Point, Inc.....192-37	133	Teletex Communication.....192-28
8	Corvus Systems.....14	117	MFJ Enterprises.....192-52	15	Televideo Systems.....30, 31
84	CP Aids.....192-27	73	MicroAge Computer Stores.....150	39	Texas Instruments Inc.....12, 13, 50
168	CPU Shop.....192-61	85	Micro Lab.....44	206	T.H.E.S.I.S.....192-84
67	Cromemco, Inc.....144, 145	75	Microlog, Inc.....151	200	TimberTech Computer Camp.....192-82
151	Cybernetics.....187	127	Micromanagement Systems, Inc.....192-24	9	Timex Sinclair User Magazine.....71
204	Cybertext.....192-84	155	Micro-Mania.....192-62	208	Triplanet, Inc.....192-84
182	Data Specialties Mart.....192-39	26	Microsoft.....160, 161	13	TSK Electronics Corp.....24
138, 159	Data-Support.....192-31, 192-56	2	Montour Wood Products.....192-54		United Computer Corp.....28
177	Data Systems.....192-70	172	Mountain Computer, Inc.....1	17	Universal Data Systems.....36
119	Data tek.....192-16	1	NEBS Computer Forms.....192-25	83	U.S. Robotics, Inc.....179
145	Davong Systems.....192-43	16, 18	NEC Home Electronics, Inc.....C-2		Venice Woodworking.....192-18
193	DB/DC Software Assoc.....192-80	104	NEC Information Systems, Inc.....21, 175	88	Ven-Tel Inc.....204
22	Diablo Distribution.....54	63	North Star Computers, Inc.....202	30	Vindex, Inc.....74
100	Digit.....192-57	209	O/I, Inc.....192-86	146	Votrax.....192-42
	Digital Equipment Corp.....152, 153	99	Okidata.....193	143	Vynet.....192-40
157	Dilithium Press.....192-53		Omega International.....140	74	Wadsworth Electronic Publishing.....192-7
176	Discount Software.....192-69	6	Osborne Computer Corp.....11		Wang Laboratories, Inc.....52
56	Discwasher Computer Accessories.....130	195, 205	Pacific Exchanges.....192-80, 192-84	97	Wisconsin Discount Sales.....191
126	Diskette Connection.....192-83	32	Palomar Computer Products.....76		Woodstown Electronics.....192-86
	Dow Jones Information Svcs.....120			166	The WoodWorks.....192-60
137	Dresselhaus.....146			183	Zephyr Micros.....192-74
130	Dynacomp.....192-55				
109	Dynalogic.....210				

ADVERTISING STAFF

VICE PRESIDENT AND PUBLISHER **Robert J. Lydon**

SALES SUPPORT MANAGER **Joy Nichols**

SALES COORDINATOR **Anne Lee Lacitignola**

PRODUCTION ASSISTANT **Carol Tabak**

SALES ASSISTANT **Patricia Donnelly**

DISTRICT MANAGERS

Cheryl Erber (408) 736-6667

Robert Erber (213) 641-6544

Ferris Ferdon (214) 231-0523

Barbara Gough (408) 736-6667

William Knickel (408) 736-6667

Carol Meier (201) 843-0550

Robert Pavone (201) 843-0550

Arlene Schulman (201) 843-0550

JAPAN

Haruki Hirayama (03) 350-5666



GREAT NEWS FOR EVERYONE WITH A PERSONAL COMPUTER: A NEW BREED OF PRINTER, PURRRFECTLY PRICED.

High Performance Word and Data Processing For Under \$700.

When advertising, TV and film people need a puma to pose or a lion on location, they call the Dawn Animal Agency. Daily, Dawn sends their exotic animals from coast to coast. And they generate a jungle of data in the process. Like so many growing businesses, they need to mate a personal computer to a printer that will keep pace with business demands. But won't take a huge bite from the budget.

Okidata's new multifunction Microline (ML) 92 printer is just the animal. For letters, memos or manuscripts, this advanced dot matrix printer gives you text printing that's a match for any daisywheel's. It prints graphs, charts and illustrations. Even emphasized and enhanced printing to help you stress a point. As for data processing, this cat doesn't pussyfoot around. Information flies from the 92 at 160 cps. And there's an ML 93, too, that adds wide-column printing to the picture.

Like each in our full line of high performance printers, the new ML 92 and 93 are built strong to keep on run-

ning, right down to the print head that's guaranteed for one full year. But the really great news about each is price: \$699 suggested retail for the ML 92; slightly more for its wide-column partner. Absolutely purrrfect.

For more detailed information, and for the name of the dealer nearest you, call 1-800-OKIDATA. In NJ, 609-235-2600.

OKIDATA

Mt. Laurel, NJ 08054

A subsidiary of Oki Electric Industry Company Ltd.

All Okidata printers are compatible with Apple, IBM, Radio Shack, Osborne and just about every other personal computer.

H & E COMPUTRONICS INC.

• • • EVERYTHING FOR YOUR TRS-80™ • ATARI™ • APPLE™ • PET™ • CP/M™ • XEROX™ • IBM™ • OSBORNE™ • • •

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. • ATARI is a trademark of Atari Inc. • APPLE is a trademark of Apple Corp. • PET is a trademark of Commodore
* CP/M is a trademark of Digital Research • XEROX is a trademark of Xerox Corp. • IBM is a trademark of IBM Corp. • OSBORNE is a trademark of Osborne Corp.



★ All orders processed within 24-Hours
★ 30-Day money back guarantee

BUSINESS PAC 100

100 Ready-To-Run Business Programs

(ON CASSETTE OR DISKETTE).....Includes 128 Page Users Manual.....
Inventory Control.....Payroll.....Bookkeeping System.....Stock Calculations.....
Checkbook Maintenance.....Accounts Receivable.....Accounts Payable.....

BUSINESS 100 PROGRAM LIST

NAME DESCRIPTION

1	RULE78	Interest Apportionment by Rule of the 78's
2	ANNU1	Annuity computation program
3	DATE	Time between dates
4	DAYYEAR	Day of year a particular date falls on
5	LEASEINT	Interest rate on lease
6	BREAKEVN	Breakeven analysis
7	DEPRSL	Straightline depreciation
8	DEPRSY	Sum of the digits depreciation
9	DEPRDB	Declining balance depreciation
10	DEPRDDB	Double declining balance depreciation
11	TAXDEP	Cash flow vs. depreciation tables
12	CHECK2	Prints NEBS checks along with daily register
13	CHECKBK1	Checkbook maintenance program
14	MORTGAGE/A	Mortgage amortization table
15	MULTMON	Computes time needed for money to double, triple, etc.
16	SALVAGE	Determines salvage value of an investment
17	RRVARIN	Rate of return on investment with variable inflows
18	RRCONST	Rate of return on investment with constant inflows
19	EFFECT	Effective interest rate of a loan
20	FVAL	Future value of an investment (compound interest)
21	PVAL	Present value of a future amount
22	LOANPAY	Amount of payment on a loan
23	REGWITH	Equal withdrawals from investment to leave 0 over
24	SIMPDISK	Simple discount analysis
25	DATEVAL	Equivalent & nonequivalent dated values for oblig.
26	ANNUDEF	Present value of deferred annuities
27	MARKUP	% Markup analysis for items
28	SINKFUND	Sinking fund amortization program
29	BONDVAL	Value of a bond
30	DEplete	Depletion analysis
31	BLACKSH	Black Scholes options analysis
32	STOCVAL1	Expected return on stock via discounts dividends
33	WARVAL	Value of a warrant
34	BONDVAL2	Value of a bond
35	EPSEST	Estimate of future earnings per share for company
36	BETAALPH	Computes alpha and beta variables for stock
37	SHARPE1	Portfolio selection model-i.e. what stocks to hold
38	OPTWRITE	Option writing computations
39	RTVAL	Value of a right
40	EXPVAL	Expected value analysis
41	BAYES	Bayesian decisions
42	VALPRINF	Value of perfect information
43	VALADINF	Value of additional information
44	UTILITY	Derives utility function
45	SIMPLEX	Linear programming solution by simplex method
46	TRANS	Transportation method for linear programming
47	EOQ	Economic order quantity inventory model
48	QUEUE1	Single server queueing (waiting line) model
49	CVP	Cost-volume-profit analysis
50	CONDPROF	Conditional profit tables
51	OPTLOSS	Opportunity loss tables
52	FQJQJQ	Fixed quantity economic order quantity model
53	FQEQWSH	As above but with shortages permitted
54	FQEQQPB	As above but with quantity price breaks
55	QJUEJCB	Cost-benefit waiting line analysis
56	NCFANAL	Net cash-flow analysis for simple investment
57	PROFIND	Profitability index of a project
58	CAP1	Cap. Asset Pr. Model analysis of project

59	WACC	Weighted average cost of capital
60	COMBAL	True rate on loan with compensating bal. required
61	DISCBAL	True rate on discounted loan
62	MERGANAL	Merger analysis computations
63	FINRAT	Financial ratios for a firm
64	NPV	Net present value of project
65	PRINDLAS	Laspeyres price index
66	PRINDPA	Paasche price index
67	SEASIND	Constructs seasonal quantity indices for company
68	TIMETR	Time series analysis linear trend
69	TIMEMOV	Time series analysis moving average trend
70	FUPRINF	Future price estimation with inflation
71	MAILPAC	Mailing list system
72	LETWRT	Letter writing system-links with MAILPAC
73	SORT3	Sorts list of names
74	LABEL1	Shipping label maker
75	LABEL2	Name label maker
76	BUSJUD	DOE business bookkeeping system
77	TIMECLCK	Computes weeks total hours from timeclock info.
78	ACCTPAY	In memory accounts payable system-storage permitted
79	INVOICE	Generate invoice on screen and print on printer
80	INVENT2	In memory inventory control system
81	TELDIR	Computerized telephone directory
82	TIMEUSAN	Time use analysis
83	ASSIGN	Use of assignment algorithm for optimal job assign.
84	ACCTREC	In memory accounts receivable system-storage ok
85	TERMSPAY	Compares 3 methods of repayment of loans
86	PAYNET	Computes gross pay required for given net
87	SELLPR	Computes selling price for given after tax amount
88	ARBCOMP	Arbitrage computations
89	DEPRSF	Sinking fund depreciation
90	UPSZONE	Finds UPS zones from zip code
91	ENVELOPE	Types envelope including return address
92	AUTOEXP	Automobile expense analysis
93	INSFILE	Insurance policy file
94	PAYROLL2	In memory payroll system
95	DILANAL	Dilution analysis
96	LOANAFD	Loan amount a borrower can afford
97	RENTPRCH	Purchase price for rental property
98	SALELEAS	Sale-leaseback analysis
99	RRCONVBD	Investor's rate of return on convertible bond
100	PORTVAL9	Stock market portfolio storage-valuation program

- ☐ TRS-80 Cassette Version \$99.95
- ☐ TRS-80 (Mod-I or III), Pet, Apple or Atari Versions \$99.95
- ☐ TRS-80 Mod-II, IBM, Osborne and CP/M Versions \$149.95

ADD \$3.00 FOR SHIPPING IN UPS AREAS
ADD \$4.00 FOR C.O.D. OR NON-UPS AREAS
ADD \$5.00 TO CANADA AND MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA AND MEXICO

COMPUTRONICS
MATHEMATICAL APPLICATIONS SERVICE™

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

ASK FOR OUR 64-PAGE CATALOG

DEALER INQUIRIES INVITED

**NEW TOLL-FREE
ORDER LINE**
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

AMERICAN
EXPRESS

**24 HOUR
ORDER
LINE**
(914) 425-1535

master charge

ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE
DELIVERY SUBJECT TO AVAILABILITY

Software Assumptions

Your interview with Fred Gibbons on page 43 of the March 1983 issue has prompted me to focus on an assumption commonly made by sellers and buyers, and which continues to lead many small business and professional firms into some very costly and disappointing experiences with computers.

The assumption is that software for word processing, data processing, spreadsheeting, data-base management, vertical markets, etc. are all species of the same grand genus "software," and that accordingly each shares the same underlying economic and performance characteristics. Maybe this assumption holds if one defines software narrowly as the programs encoded on a magnetic medium. To this extent, it is obvious that once the original development and encoding is done, the economics of mass producing additional copies are such that unit prices drop, or at least should drop, as volume rises.

But whether falling prices mean significantly lower real costs to buyers depends on the type of software.

Word-processing software provides an instance where there is normally a close correlation between price paid and real cost to the buyer. The buyer doesn't have to spend much time reorganizing his office before he gets a payoff. He knows what he wants his documents to look like, and it doesn't take him long to figure out whether making them look that way is easy or hard to do on his machine. He

knows what he's got in a few hours or days or weeks. And if he likes it, it's a success; if he doesn't, it isn't. Also, he can work largely by himself. "He can," to quote Fred Gibbons, "do what he wants with the computer and has no obligation to use it the way the organization wants him to."

This is all very well for word processing and certain other application areas, but immense damage is being done by letting people assume that the same quick payoffs and personal liberation come from software of all types. The fact is, the correlation between software prices and real costs to buyers really falls apart when it comes to vertical market software aimed at specific business problems. This is also true of some general-purpose accounting software. In these areas, unfortunately, the software price paid is but a small portion of the real costs of getting the benefits—in order to succeed you've got to work very hard and deal with a large number of hidden pitfalls. For example:

- Now that you've got your automated general ledger, you may be surprised to find that you can't tell whether it's working because, alas, you don't really know what a general ledger is supposed to do. That's strange because you didn't have that problem with the word-processing program. Either you're going to have to spend time finding out about accounting on your own, or somebody else is going to have to spend time telling you.

- Inasmuch as you've applied yourself to the problem of converting your business and accounting records to the new system, you're disappointed to find that after two months all you've done is create your client master files. No doubt by this time you've forgotten what the "comprehensive" training session taught you about what to do next.

- Now, after three months of work, you find when you run invoices that you really should have put something in field two rather than in field three of each client master file. You just can't let your invoices go out that way. But the computer's working just fine because when you checked the user's manual you found

that, yes, you didn't exactly follow the instructions.

Maybe these are not software problems at all but ones that fall within the purview of training, accounting, or management consulting. Maybe acquiring what's needed in these background areas and knowing what it takes to put a full business system into place are the responsibility of the user. Maybe the level of sophistication among users is growing so rapidly that these problems are just going to disappear on their own. Maybe.

My concern is that in our rush to make a buck from the trend to put personal computers in the office we may be preaching so loudly the gospel of cheaper software that the sounds of the real costs of serious business solutions get muffled until it's too late—until the user gets burned.

It may well be that the anticipated \$6 billion software market of 1985 will largely be made up of payments made to clean up the messes of 1983 and 1984.

I'd rather see more bundling of vertical market software with professional training so that the real costs can be made to stand up, be counted, and be managed.

Rodney C. Piette
GILL & PIETTE, INC.
WASHINGTON, D.C.

"Hayden's *Personal Computing* magazine's accuracy policy: to make diligent efforts to insure the accuracy of editorial material. To publish prompt corrections whenever inaccuracies are brought to our attention. Corrections appear in 'Letters.' To encourage our readers as responsible members of our business community to report to us misleading or fraudulent advertising. To refuse any advertisement deemed to be misleading or fraudulent."

GRAPHICS FOR CP/M-BASED MACHINES

You seem to have a knack for telling your readers things I know aren't true. On page 21 of the March 1983 issue, for instance, in the question on why or why not to buy an Osborne, you say: "CP/M 2.2 doesn't support graphics." There are indeed graphics on the Osborne, and some of the games available for it—and for other CP/M-based computers—use graphics heavily.

The Osborne has 32 graphics characters, or 64 including the 32 with underscore. The November issue of *Foghorn*, a monthly newsletter of the First Osborne Group (FOG), carries an ad for Supergraf, a complete graphics editor for the Osborne 1. Supergraf costs \$49.95, and is available from ENCON Engineering

BASF QUALIMETRIC™ A TOTALLY NEW DIMENSION OF QUALITY.



From BASF comes a totally new level of excellence in magnetic media—the Qualimetric standard, a standard so advanced that BASF FlexyDisks® are confidently backed by an extraordinary new lifetime warranty.* The Qualimetric standard is maintained without compromise through every step of BASF design, production, inspection, and testing...reflecting an unwavering BASF commitment to media fidelity and durability.

Our FlexyDisk jacket incorporates a unique two-piece liner that not only traps damaging debris away from the media surface, but also ensures precise media-to-head alignment. The result—certified 100% error-free performance, backed by BASF's exclusive lifetime warranty.*

For information security, tomorrow and beyond, look for the distinctive BASF package with the Qualimetric seal. Call 800-343-4600 for the name of your nearest supplier.

ENTER TOMORROW ON BASF TODAY



*Contact BASF for warranty details. © 1982, BASF Systems Corporation, Bedford, MA

CIRCLE 129

Consultants, 1885 The Alameda, San Jose, CA 95216.

In addition, there's Easygraf for Epson Grafrax+ and the Osborne 1. It costs \$19.95, and can be obtained from Small-Soft, 6808 Estrella Ave., Twentynine Palms, CA 92277. SCRPAINT.BAS is a public domain program available from some Osborne users' groups across the country. It allows you to "paint" a graphics picture on the screen and save the BASIC program required to generate the picture.

Benjamin H. Cohen
CHICAGO, IL

IN COMPUTING, AGE IS NO BARRIER

I sure liked the article "When The Boss Broke The Rules..." on page 67 of your March 1983 issue. It reminded me of myself.

I'm 64 years old and just bought my first computer, because it's something I thought I should know about. I especially liked the remark, "The older fellows... have done it the hard way for so long that as soon as we recognized the power of the computer, we jumped right on it." Never discount the older guy as "stuck in the mud."

I'm involved in multimedia productions and started working with mini-microprocessors to run 35mm projectors. I've since graduated to Apple computers not only to program and run my projectors, but to do all sorts of things in my photographic lab.

To me, working with computers is like the first time I used a Leica instead of an 8 by 10 camera, or the first time I used an automatic camera instead of an exposure meter. The computer is here to stay and you'd better learn how to use it.

Walter Benson
HARRISBURG, PA

A COMPUTER CLUB SUPPLEMENT

I offer this information to supplement your March 1983 article "The Helping Hands of Computer Clubs" on page 142.

Many Osborne users maintain membership in First Osborne Group (FOG), which is the corporate title of the umbrel-

la organization that maintains the public domain disk library, publishes the newsletter *Foghorn*, and generally lobbies for the customer in addressing Osborne Computer Corporation. It does not speak for the Corporation, but provides a good two-way communications channel between Osborne and its customers, as well as the usual information exchange among users about hardware, utility, applications programs, and idiosyncratic tricks.

There are also many local groups of Osborne users who gather independently to trade information on problems and their solutions, to encourage beginners, and to capitalize on the experience of computer professionals and avid amateur hackers among the members. Many of these groups have adopted a suggested set of bylaws and a minimal organization to the end that they are formally recognized as "Authorized Local FOG Chapters."

The best address for information on Osborne Users' Groups is FOG, P.O. Box 11683-A, Palo Alto, CA 94306.

Byron Davies
PRESIDENT
SAN FRANCISCO FOG

GETTING COMPUTERS INTO THE CLASSROOM

This letter is in response to a letter from Cindy Eusey of Bucyrus, Ohio, which appeared on page 11 of your March 1983 issue.

If Eusey is unsuccessful in her efforts to find funding for a classroom computer, she might consider talking to her fellow teachers to see if anyone shares her concern and enthusiasm.

After wanting a computer for almost two years, and never having the necessary money, I found two partners who were interested in sharing the expense. The economic advantage is obvious. We were able to purchase a system that totally suited our needs—one that none of us could have afforded alone. The computer is located close to all of us, and conflicts of usage rarely occur.

If Eusey could find two or three colleagues willing to split the cost, the entire system could be put onto a portable cart, and an equitable time-sharing arrangement could be worked out. Once the word gets out on the time saving she is real-

izing, not to mention the increase in student interest and achievement, I feel her fund-raising efforts will improve.

I realize I'm encouraging Eusey to make a personal investment. But it is one that will reap many rewards—not only for her students who will have to face a high-tech work world where computer competence will be expected rather than desired, but for herself as an enlightened and progressive educator who desires to stay in step and remain relevant and effective.

Dwight S. Wilson
BELLFLOWER, CA

PRINTERS FOR THE TRS-80 MODEL III

In your February 1983 Answers column, page 166, you had a question about printers for a TRS-80 Model III with 48k and two disk drives. In your reply you neglected to mention the Smith-Corona TP-1.

While I recognize that the TP-1 is an extremely slow printer, and has a few idiosyncrasies that I've remedied through a small applications program I wrote, it does an excellent job with my TRS-80. I substituted the TP-1 for an IBM Model 75 typewriter and have not regretted the trade. What I lost in speed, I gained in efficiency.

Jim Hunt
BOISE, ID

SOFTWARE FOR THE 64

I found your February answer to "Will There Be Software for the Commodore 64?" interesting (page 13). However, apparently due to lack of information, RSVP, Inc. was not included. I believe we are the first company to offer entertainment software for the 64 as our only product line.

S. Bryan Vaughan
PRESIDENT
RSVP, INC.
FT. MYERS, FL

ADDITIONS

The photograph on page 24 of the February 1983 issue of *Personal Computing* was taken by Jake Peters. The photographs beginning on page 211 of the April 1983 issue were taken by Ted Hall.



Shown are IBM-PC* compatible programs. The Columbia MPC runs MS-DOS* plus six other operating systems.



THE COLUMBIA MPC WORKS WITH A WORLD OF SOFTWARE. \$3,000 WORTH COMES FREE WITH THE SYSTEM.

World Headquarters:
8990 Route 108
Columbia, MD 21045
(301) 992-3400
TWX 710-862-1891

West Coast:
3901 MacArthur Blvd.
Suite 211
Newport Beach, CA 92663
(714) 752-5245
Telex 277778

Europe:
Limitenstr. 94
4050 Moenchengladbach 2
West Germany
Phone 02161-33159
Telex 852452

Call our distributor nearest you.
Access Systems
Wellesley, MA
(617) 237-7743

N.I.D.I. (National Instru-
ment Distribution Inc.)
Dayton, OH
(513) 435-4503

Advanced Management
Systems
Aurora, CO
(303) 752-2972

RPC Electronics
Cleveland, OH
(216) 461-2280

Central Microcomputer
Distributors
Montreal, Quebec, Canada
(514) 849-7533

RPC Electronics
Pittsburgh, PA
(412) 782-3770

Distributors in Australia, Austria, Belgium, Colombia, Denmark, Hong Kong, Israel, Italy, Malaysia, Netherlands-Antilles, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, Venezuela.



Today, the Columbia MPC takes on hundreds of IBM-PC compatible software programs and IBM-PC add-ons or peripherals.

What's more, six other Columbia-supported operating systems are available — CP/M-80*, CP/M-86*, Concurrent CP/M-86*, MP/M-86* (OASIS-16* and XENIX* available soon) — stretching the Columbia MPC's software compatibility beyond any other personal computer.

Farther, faster, for far less.

The Columbia MPC is shipped with fully supported software that will save you \$3,000. Included is the entire self-teaching Perfect Software™ family: Perfect Writer™, a word processor; Perfect Speller™, a 50,000 word dictionary; Perfect Filer™, a data

base manager; and Perfect Calc™, a financial calculation system.

In addition you get MS-DOS, CP/M-86, Macro/86 Assembler, BASICA*, Asynchronous Communications Support, Diagnostics and the Columbia Tutor program. This means your Columbia MPC is up and running right out of the box. Space Commanders and Fast Graphs show off the Columbia MPC's full-color graphics.

Way out front in value and performance.

With a list price of \$3,995 — including 128K RAM, 640K in dual disk drives, 8 IBM-PC compatible expansion slots, 2 serial and 1 parallel I/O, IBM-PC compatible keyboard, and color graphics monitor controller — the Columbia MPC is

ready to go. And a complete 12MB hard disk system lists for \$5,995 — software included! B/W or color monitors and printers optional.

Made in U.S.A. — supported worldwide.

All Columbia hardware and software are backed by the "Call for Columbia" national service program. So, call us or our distributor for the dealer nearest you — and start looking at the Columbia MPC. It'll show you a whole new world of performance and value.

COLUMBIA

DATA PRODUCTS, INC.

Commerical Computer Sales
Atlanta, GA
(404) 256-9190

Empire Micro Products
Rochester, NY
(716) 626-3660

MP Systems
Dallas, TX
(214) 385-8885

Mid Tech Associates
Desoto, KS
(913) 441-6565

Mid Tech Associates
Florissant, MO
(314) 837-5200

Mytec, Inc.
Sanford, FL
(305) 321-2301

Renaissance Technology
Corp.
Concord, CA
(415) 676-5757

Southeastern Data
Products
Lynchburg, VA
(804) 237-6286

Tek-Aids Industries
Arlington Heights, IL
(312) 870-7401

Tele-Terminals
Brooklyn Park, MN
(612) 328-3072

Waybern Corporation
Garden Grove, CA
(714) 554-4520

Perfect Software, Perfect Writer, Perfect Speller, Perfect Filer, and Perfect Calc are trademarks of Perfect Software, Inc. IBM is a trademark of International Business Machines. CP/M and MP/M are registered trademarks of Digital Research, Inc. OASIS is a trademark of Phase One. MS-DOS and XENIX are trademarks of MICROSOFT.

CRYSTAL UNIFORMITY
ADVANCED BINDER
REFINED LUBRICANT
IMPROVED JACKET
INTENSIFIED CALENDERING

THE GOLD STANDARD

**You can wait for industry standards
to mandate improved performance.
Or you can have it now on Maxell.
The Gold Standard.**

The refinements of The Gold Standard, from oxide particles to lubricant to jacket, are uniquely Maxell. And therefore, so are the benefits.

Our unique, uniform crystals assure dense oxide packing. So you begin with an original signal of extraordinary fidelity. A signal we safeguard in ways that leave industry standards in our wake.

An advanced binder bonds oxides to the base material preventing time and money-wasting dropouts.

Calendering then smooths the surface for a read/write signal that stays

clear and accurate. And lubricants reduce friction between head and disk for a longer media and head life. To house it, we then constructed a new jacket heat-resistant to 140° F to withstand drive heat without warp or wear. And created the floppy disk that leads the industry in error-free performance and durability.

All industry standards exist to assure reliable performance. The Gold Standard expresses a higher aim: perfection.



maxell.
IT'S WORTH IT.

Computer Products Division, Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074 201-440-8020

Adam Osborne: A Computer Pioneer Talks About The Future Of The Industry

Even if he hadn't seen "a truck-size hole in the market," through which he drove the first portable computer to fame and fortune, Adam Osborne, at 43, would still be a highly recognizable figure in the personal-computer world. His first, self-published book on the subject, *An Introduction to Microcomputers*, sold 300,000 copies and enabled Osborne to start his own publishing firm, which was subsequently purchased by McGraw-Hill. At the same time, Osborne's columns, usually provocative and often scathing, were appearing in the computer trade press. The embryonic personal-computer industry clearly wasn't living up to Osborne's standards. But Osborne wasn't content to observe the action from the sidelines: He decided to try his hand at the business himself.

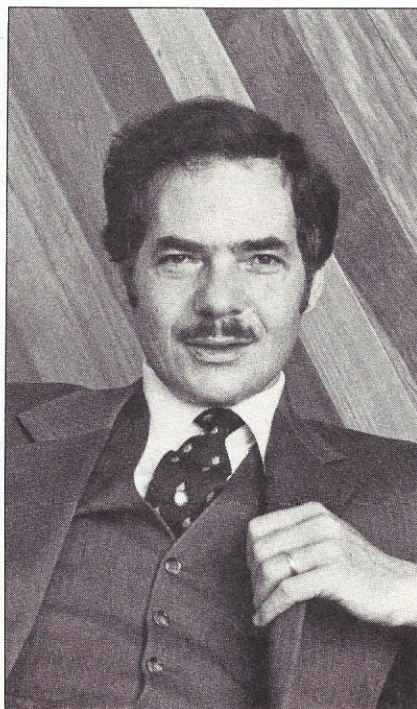
The result was the Osborne 1, the first portable computer, which took all of four months to design. When it appeared in 1981, offering a complete computer plus a full complement of software for the low price of \$1795, it created a sensation. Now, the Osborne has some formidable competitors, both in terms of price and portability. But Osborne got there first, and has reaped the benefits. The Osborne Computer Corporation fills several sprawling buildings in Hayward, California, on the edge of San Francisco Bay. The firm is still growing so quickly that by the time the most recently constructed building was finished, the staff had already outgrown it.

Adam Osborne's role in the company is changing as well. Shortly before *Personal Computing* visited, Osborne stepped down as president of the company, relinquishing the role

to Robert Jaunich, a seasoned manager with little previous experience in the computer industry. Osborne stays on as chairman of the board, remaining involved in the more technology- and marketing-related aspects of the business.

At the time of this interview, in early March, Osborne was absorbed with the details of the Osborne Executive, the company's second product, which is reviewed on page 169.

"I suspect that 95 percent of all computers sold will never be programmed."



photos by Carol A. Foote

You were recently quoted as saying that the future involves "designing and selling computers which people don't realize are computers at all." Can you elaborate on that?

Osborne: We're looking toward the era of the business machine—something you use specifically for word processing and don't think of as a computer. At another desk you'll have a machine you use for financial calculations, and you'll look upon it as a numerical processor. Computers to me are programmable, and I suspect that 95 percent of all computers sold will never be programmed, not even using techniques like The Last One or a data base or anything else. And probably less than 1 percent will get programmed in a programming language. So if you're dealing with 99 percent of the market, why not take out all of that stuff?

And even more so for the home?

Osborne: Yes. There's very little use for a computer in the normal household, outside of business and professional applications.

Yet there is a huge home market projected.

Osborne: Oh, there will be. But not for home computing. It will be for education, entertainment, electronic mail, home security. But take home security—you're not going to have an entire microcomputer sitting somewhere running your security system, any more than you have an electric motor on a concrete slab in the middle of the living room running your refrigerator and washing machine.

In the past, you've suggested that there are areas of society where computers absolutely should not be allowed—banking, elections and the stock exchanges. Have you changed your mind?

North Star solutions are simple and powerful.

Not everyone needs a small business computer as powerful and fully-featured as a North Star. The North Star ADVANTAGE and HORIZON® micro-computer systems are built for those who demand a great deal more... of themselves as well as the vital tools they select for office automation.

Powerful

Putting a North Star system through its paces is like high-speed driving in a luxury sports car: instant response to user commands, with a feeling of untapped resources within. Your North Star system has the power to get you through the fast curves of business and over towering peaks in workload. North Star outperforms the industry in single-user, multi-user and now in office network systems.

Simple

Advanced software engineering has harnessed the power of the HORIZON and ADVANTAGE, so that achieving your results is as simple as a Sunday drive. Concise user commands instruct the computer to work the way you want it to.

And, we keep it simple everywhere: service, system expansion, and even custom software.

Solutions

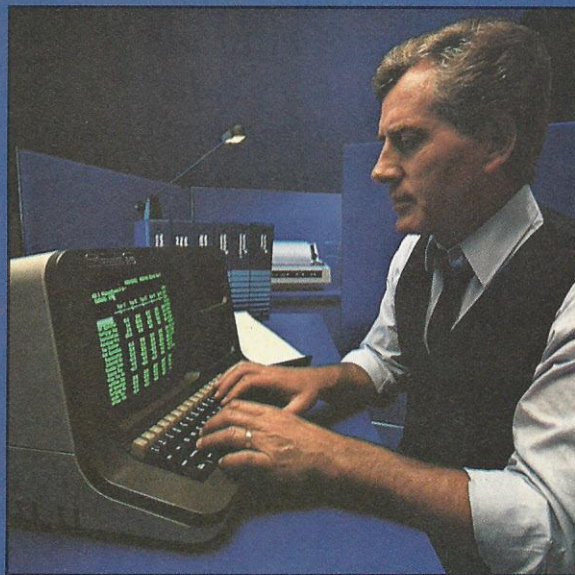
North Star systems are designed to get you from A to B as effectively as possible. The

designed-in harmony of our word processing, planning, accounting and other applications permits faster solutions and a broader range of possible accomplishments.

And no solution is complete until it is in presentation form. North Star graphics concisely present your results in charts, graphs and graphic figures.

Discover North Star's simply powerful solutions at one of over 1000 computer stores or systems houses. Call 800-447-4700 for the location nearest you, or write North Star Computers, Inc., 14440 Catalina Street, San Leandro, CA 94577.

NorthStar™
Simply powerful solutions.



The North Star logo, tagline and HORIZON are either trademarks or registered trademarks of North Star Computers, Inc. © 1983.

Systems serviced nationwide by MAI/Sorbus Service Division.

Osborne: Not at all. By chance, I met Donn Parker [Stanford Research Institute expert on computer crime] on a flight to New York last week. And he just reinforced my belief. The problem isn't outsiders attacking the system, it's the insider. As much as you try to put smart security systems in, the smart insider can keep ahead of them.

Yet banks are rapidly expanding the use of electronic fund transfers, and are moving toward home banking as well.

Osborne: The banks claim they know how much they're losing through fraud, and that it's a small amount, and that's the price you pay. My argument is that they have no idea what they're losing—most of the crime they don't know about. By the time they do find out about it, it's too late, and they hush it up.

Donn Parker told me about a recent case of electronic funds fraud, where the bank got together with the embezzler and told him that as long as he moved to Europe and never came back, and never talked publicly about the case, they wouldn't prosecute. And he could keep the money. They were far more concerned with their image than with the amount they'd lost.

You've predicted a disaster on the order of Three Mile Island, involving computers and banking.

Osborne: It's only a question of time before some group—the Mafia, or a foreign country, or just some very bright guys—figures out how to rip off a major bank so they don't know they're being ripped off, until it causes the economic collapse of the unit. All they have to do is keep balancing every theft with a bogus entry, and this can go on until the liquidity of the bank is destroyed—until they realize that the dollar bills are simply not there.

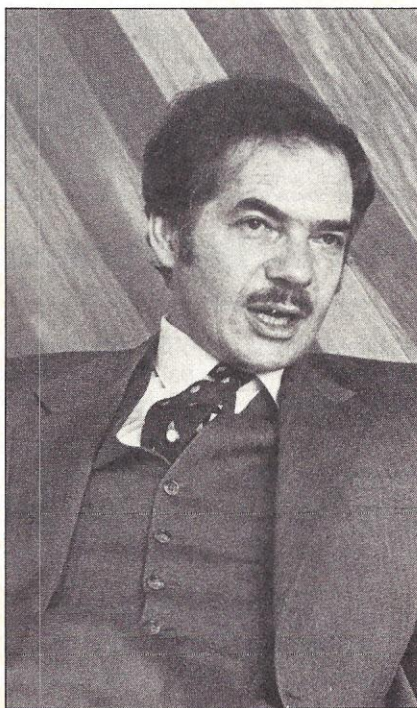
What about computers and employment? Right now we're sitting just north of shut-down Ford and GM plants—yet I don't see many of those

unemployed workers getting jobs in electronic assembly plants.

Osborne: While they were dominant, the auto workers got together and managed to obtain artificially high wages, and that's why the auto industry is suffering now. The people doing board-stuffing and testing aren't doing work that is any less demanding than the auto worker on the assembly line, but they're getting paid a lot less, because they're earning what the free market says they should earn.

Another part of it, though, is the increase in automated testing, robotized assembly, that sort of thing. It's my feeling that intelligent machines will tend to stratify employment—there will be the minimum wage jobs, and then the jobs that re-

“[In areas involving technology] American education is woefully inadequate.”



quire quite a bit of technical background, and very little in between.

Osborne: I believe you're right. In between there will be the leisure and entertainment jobs—that's where everyone else will be. We'll have the technocrats, and I think you're accurate in saying that these people will all have demanding jobs. There will no longer be room for a secretary or a clerk—those people will have to be able to operate very sophisticated business machines built around computers. And before very long, so much of that work can be shifted to the boss, that the boss won't have enough low-level clerical work for a secretary to do. Now we're going a step further and talking about a boss with an assistant, rather than a secretary, where the boss and assistant can do the work that two bosses did previously. And so the number of people employed in business dwindles.

The answer to all this is that if we're smart, and I'm not optimistic that we will be, then we'll have more leisure time and we'll spend that leisure time dealing with people. We won't go to restaurants to be served by automatons. We won't go sailing someplace where machines get the boat ready for you. Wherever we go to spend our leisure time, we'll want to deal with people, and that's where the remainder of society will get its jobs. However, if we don't prepare for it, it won't happen. Instead of a lot of people with leisure time, we'll have a few people with jobs and no leisure time, and a lot of people on welfare. *Obviously, education is a big part of that social transition. Yet, as you've pointed out, in a lot of high-tech situations, qualified teachers aren't going to be around—they'll be in private industry where they can make three times the salary.*

Osborne: American education is woefully inadequate. Something needs to be done. The American educational system suffers from being under the autonomy of local school districts, and they follow, rather than lead.

Effortless Communication



"Modem and software \$389, cane and bowler hat not included."

PC Modem Plus & IBM Personal Computer

Effortless The PC Modem Plus™ system contains everything you need to communicate with the IBM Personal Computer—modem, communications software, telephone cable and complete instructions.

Modem The modem card fits inside the PC, connects directly to the phone line and includes an additional IBM-compatible asynchronous port. The full duplex, auto-answer/auto-dial, 300 baud modem can tone or pulse dial and is compatible with most

other communications software packages. Full duplex 1200 baud (212) operation is available with the addition of Ven-Tel's PC Modem Plus Speed Adapter™.

Software The full featured communications software has auto-logon and data capturing ability. You can store information from Dow Jones News/Retrieval™ or other sources on disk, exchange information with mainframes, minis or personal computers and transfer files to other Crosstalk™-compatible systems.

From Ven-Tel Inc.

Modems That Mean Business

2342 Walsh Avenue, Santa Clara, CA 95051 • (800) 538-5121 • (408) 727-5721

PC Modem Plus and PC Modem Speed Adapter are trademarks of Ven-Tel Inc. The PC Modem Speed Adapter will be available second quarter 1983. IBM is a registered trademark of International Business Machines Corporation. Dow Jones News/Retrieval is a registered trademark of Dow Jones & Co. Crosstalk is a trademark of Microstuf, Inc.

When a smart government runs education, it can look ahead and see that, say, technical education is going to be important. The university can say "Here's what we're looking for in our students," and the government tells the schools to provide it. Here, you have local school boards operating their systems within the limited vision of whatever they happen to understand.

The novel you're writing deals with the ultimate impact of technology on society, and it's not an optimistic view.

Osborne: I think that technology is about to become its own worst enemy. We're rapidly reaching the point where people are beginning to doubt technology. In the 1950s, technology had to make your life better. Now, in the 1980s, people are saying "Wait a minute, is that going to make me wealthier, or is it just going to take away my job?" People aren't going to be that excited by technology, particularly when you see more and more of the present turmoil, which I predict is only going to be worse, because the government can't cope with it. More and more people are going to be negatively impacted by technology.

In some of the Osborne advertising there is a fairly explicit comparison between you and Henry Ford. Do you think history will agree with that parallel?

Osborne: I think it's a valid comparison in that Henry Ford was the first to come along and make the car utilitarian, and I was the first person to come out with what I call the utilitarian computer, which allowed me to drop the price. But the real validity of the comparison 50 years from now is going to depend on the significance of the microcomputer in our daily lives compared with the automobile. Will the microcomputer be as important to daily life 50 years from now as the automobile is today? The probability is that it won't be.

That's interesting. I would have guessed that you'd say it would be as

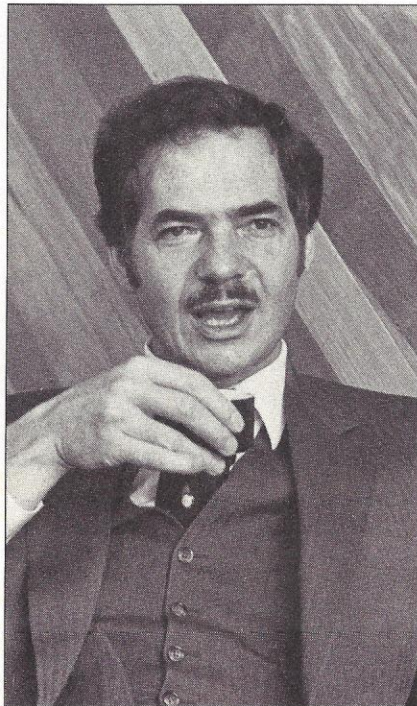
significant as the automobile, or more so.

Osborne: No. Microelectronics will be significant. Microcomputers, not so. Every refrigerator and every washing machine will have a microcomputer in it. There will be—who knows—probably 100 microcomputers in every house, locked away in various electronic control systems. There may be one microcomputer that's being used as a microcomputer, but not as significantly in the daily life of the individual as the automobile.

Where does the new Osborne Executive fit into the personal-computer market? It's a far more crowded field than it was when the first machine came out.

Osborne: It's very evolutionary. It

"I think that technology is about to become its own worst enemy."



takes all the things the Osborne I wasn't and becomes them. For example, I'd always wanted to put both disk drives on the side of the display screen. It's also a little less aggressively priced. From a marketing viewpoint, we're there. We're as well-known as anybody else, so we've got to start attending to profits.

The new Osborne, with the 8088 enhancement, is said to be IBM-compatible. What does that mean?

Osborne: It can read IBM diskettes and execute their programs.

A number of new machines claim IBM compatibility, but there seem to be varying degrees of compatibility.

Osborne: Well, you can never be completely compatible because you can't get the IBM ROM chip and put it in your computer. You can get the same entry points, but if anyone is going into native code in order to do anything, then you could get into legal trouble. We don't have color graphics, but we do have the IBM standard bus, and we're compatible to the extent that compatibility is possible.

Compatibility in general—or rather the lack of it—is a subject that drives many personal-computer users crazy.

Osborne: Standardization can't be done by committee because no one ever agrees. Only two things cause standardization: the economic clout of a winner, and law. There's no law; therefore, it's economic clout. In microcomputers, the de facto standard of CP/M as an operating system became evident. But there was no 5¼-inch diskette format, so everyone went out and did his own. Now IBM has come along, and it will be a standard. Why? Because IBM is successful, and because they've encouraged people to be IBM-compatible. The people at Apple, on the other hand, are cutting their own throats and painting themselves into a corner they may never get out of. The company is doing everything not to become an industry standard. In effect, Apple's saying "We're going to take on the microcomputing world single-

cdex™ Training Programs



Cdex™ Training Programs
are available for:

Application Programs

The VisiCalc® Program —
IBM® Personal Computer Version
Apple® IIe Version
Apple® II Plus Version
The WordStar™ Program
The SuperCalc™ Program
The EasyWriter II™ Program

Hardware Programs

The IBM® Personal Computer
The Apple® IIe Personal Computer

The best, most comprehensive programs written and every personal computer made, still take a considerable amount of time to learn how to use.
That is...until now!

Cdex Training Programs are computer-assisted training programs that make learning straight-forward and efficient. In an hour, you can master the material on the Cdex disks and begin using the intended product.

It's tough to learn about computers from a book. That's why all Cdex Training Programs are on disk and are:

Highly Interactive...

Creating a dialogue with you and serving as your personal tutor.

Completely Self-paced...

You set your own learning time.

Graphically Oriented...

Remember, a picture is worth a thousand words.

Use Them Now and Later...

Clear and concise training and reference programs for the first-time or experienced user.

Cdex Training Programs run on the same Apple® II Plus, Apple® IIe or IBM® Personal Computer as your other programs. See how effective a Cdex Training Program can be; ask your dealer for a demonstration.

Cdex™ Training Program:
We make it easy.

cdex™

Cdex Corporation
5050 El Camino Real
Los Altos, CA 94022
415 964 7600

handedly." And they're going to lose. They couldn't win against CP/M in 1979 and 1980, when the world belonged to them and Radio Shack. Even with that clout, they couldn't stamp out CP/M. Instead, CP/M came and encroached on their machine. But for some reason they can't see it. Standardization will come. That's why LISA will never make it. *Many commentators seem to see LISA as more of an influence—a milestone—than a viable product.*

Osborne: I think that's probably fairly accurate. The concept of LISA is a good one. We all want software that is that easy to use. The problem for Apple is that within a year there will be that kind of software available for both IBM and CP/M-based machines. Apple's advantage will have disappeared and, in the meantime, the high price of the product will have kept it out of its only natural market, which is corporate America. Every Apple salesman has to walk into the corporate suite, where he's never been before, and begin each sales pitch by saying "Let me tell you why you shouldn't buy IBM. . . ."

Was IBM's entry helpful to the personal-computer industry?

Osborne: Very helpful. All of a sudden it burst wide open corporate America as a market. Until then, they weren't quite sure whether the microcomputer was real.

What ever happened to the Japanese invasion of the personal-computer market?

Osborne: I think it eventually may come. They're like IBM—they look carefully, they act slowly, and they do it right. They haven't done it yet. In my opinion, they've been too busy addressing their domestic market, which is huge. And we're really fortunate that they have Kanji, the Japanese character set, over there, because they're busy making machines that work in Kanji. This means that their machines have so much extra hardware we don't need in America, that they're not competitive here.

Do you ever find yourself surprised, when you walk around here and see what kind of corporation has grown up in only three years?

Osborne: It's kind of awesome in a way, I suppose, but you know, it's like everything else—it always appears more awesome from the outside than from the inside. From the inside, you're so cognizant of the problems you encountered getting there, and the problems you're encountering now that you're there.

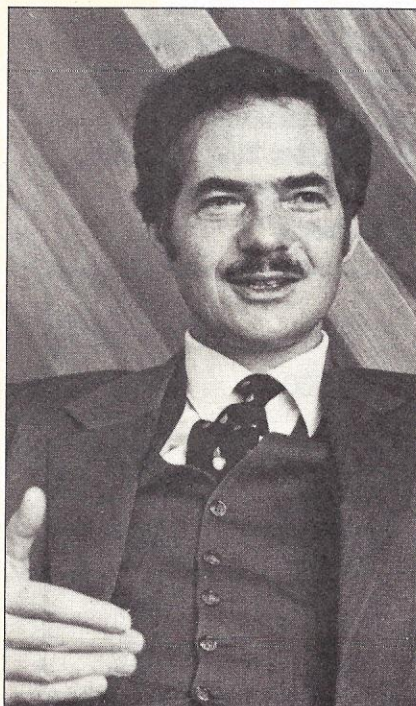
Was it difficult for you to step down as president of the company?

Osborne: Not at all.

For some entrepreneurs, that's the main failure mode.

Osborne: Exactly. As long as what they're good at is good for the com-

**"By 1990,
people just won't
accept what
we're selling
today."**




pany, they'll do well. That lasts for a short, high-growth period when the company is still so small that by just meeting in the corridor you find out what's going on. But that doesn't last long. All of a sudden you find you need management. And there, a lot of entrepreneurs are doubly handicapped, for many of them were rejects from large corporations because they couldn't cope with management. So they go out, become successful entrepreneurs, and attack that which they didn't like—the kind of large company they got thrown out of. But all they succeed in doing is hurting themselves. Entrepreneurs are very ego-driven. You have to be, or you could never do the stupid things you have to do to succeed. But successful entrepreneurs are pragmatic as hell. At some point they realize that their own egotism is going to get in the way, and they should quit right there if they want to remain successful.

Has this company satisfied your entrepreneurial instincts? Can you imagine another field capturing your interests in a similar way?

Osborne: Oh, definitely. Right now, my wife and I—mostly my wife—are about to launch a new popular music group. We're backing a New Wave band, and they're going to be right up there with the Rolling Stones in three or four years.

Overall, has the consumer been well-served by the first few years of the personal-computer industry?

Osborne: The consumer always has some problems to begin with in any new business. I like old cars; they're one of my hobbies. I had a 1948 Packard, and I have a 1940 Packard. I had a 1948 Packard because I tried to drive it on more than occasional outings. You only have to look at automobiles to realize that products that were acceptable in the past are totally unacceptable today. The same is true with our industry, only it's telescoped in time. By 1990, people just won't accept what we're selling today. 

PIE: Writer

The best microcomputer word processor any money can buy.

Thousands of dollars worth of word processing performance for just \$149.95

Who's saying that?

Arthur Naiman, for one, in the "Word Processing Buyer's Guide" to be published soon by McGraw-Hill.

In his definitive study, Naiman compared 14 major word processing products—and PIE: Writer was among the top three. Its nearest neighbors were dedicated word processors which cost from \$13,500 to

\$15,000. (See a portion of the study results below.) Yet PIE: Writer can be part of your personal computer system for just \$149.95!

So now your business or home microcomputer can have capabilities equivalent to the industry's top machines. Naiman says:

"PIE: Writer, running on a humble Apple II, out-scored every other word processing program for microcomputers . . . (It) crams an incredible amount of power into a small (23½ K) and inexpensive package . . . PIE: Writer beat four out of six dedicated word processors."

No other microcomputer word processor earned the ranking that PIE: Writer did. PIE: Writer can make your personal computer into a word processing whiz.

That's not all.

PIE: Writer has been steadily collecting honors from experts throughout the industry for its all-around price/performance and its many advanced user features.

When *Peelings II* magazine compared 10 micro word processors, PIE: Writer came out on top . . . again. *Peelings II* rated PIE: Writer "AA + " and defined the rating as "... top notch, superb." The review concluded:

"... a formidable contender in performance to price ratio . . . PIE: Writer is hard to beat."

And *Interface Age* said in an in-depth review of PIE: Writer's current version:

"... much has been gained in this update to a time-tested classic."

	Operating system(s) and/or machine(s)	Price	Overall Score
CPT 8100	dedicated word processor *	\$15,000	94¾
Dictaphone Dual Disp.	dedicated word processor *	\$13,500	85¼
PIE: Writer:	Apple II, IBM PC	\$149.95 \$199.95	84¼
A.B. Dick Magna SL	dedicated word processor *	\$14,500	83
Write	CP/M†	\$400	82¼

*Includes word processing hardware & multistation support.

†Requires additional CP/M Hardware for your personal computer (\$200-600 extra)

CP/M is a registered trademark of Digital Research *VisiCalc © is a registered trademark of VISIInc

Why the experts love PIE:Writer.

Why all the fuss?

Here are some of the features reviewers chose as the basis for PIE:Writer's excellent performance, and the reasons why you should choose PIE:Writer:

PIE:Writer is fast in executing functions such as search, scroll, page up and down.

PIE:Writer is easy to learn, with an excellent new set of user documentation.

PIE:Writer is copyable to back-up disks.

PIE:Writer can edit either text or programming code.

PIE:Writer is compatible with a wide range of hardware.

And reviewers note that PIE:Writer has refined the most sought-after editing features:

- ✓ wrap/columnar option
- ✓ text marking
- ✓ global word search & replace
- ✓ custom form letters and mailing lists
- ✓ justify right and left
- ✓ status display
- ✓ save or insert text from another file
- ✓ control page breaks
- ✓ cut and paste
- ✓ "Help" screen
- ✓ forward & backward page scrolling
- ✓ automatic centering
- ✓ full format control
- ✓ control page numbering, bottom and top headers
- ✓ underlining
- ✓ tabbing by word or moveable marks

You'll love PIE:Writer too.

You'll find everything you need in PIE:Writer. Whatever you write will be easier to do: reports, letters, books and articles, memos and personal notes. Use PIE:Writer with a 40 or 80 column set-up, lower case adapters, hard disks, modems or shift-key modifiers. PIE:Writer works with spelling checkers, Visi Calc* files and can edit program source files.

PIE:Writer gives you efficiency and capabilities far beyond other word processors. You can save valuable time and be more creative with all your documents. And PIE:Writer is an easy transition for typists as well as writers and managers.

You'll be using PIE:Writer the day you install it on your personal computer. Just a few moments with its built-in training lessons and you're up and running.

The experts use words like "powerful," "clean," "formidable" and "graceful" to describe PIE:Writer. But don't take their words for it. Try PIE:Writer yourself and enjoy the ease and excitement of the top-ranked word processor.

The Hayden Advantage.

There's another significant reason to love PIE:Writer: it's backed by Hayden Software, a company with the experience and resources to provide solid products; thorough, user-friendly documentation; and full technical support.

PIE:Writer is part of Hayden's growing "Personal Information Environment" family of software products. The PIE family also includes PIE:Speller, a 20,000 word dictionary spelling checker with a user-defined component. And PIE:Communications, which turns your personal computer into a communications center by letting you send and receive text between your computer and others.

Together with Hayden's other Professional Software products, the PIE family helps you make the most of your personal computer in any environment.

Hayden provides a full range of software for your computer, including business, entertainment, educational and technical products. Visit your local dealer and learn about the Hayden advantage.

Order Number : 13409
Runs on: Apple II
Price: \$149.95

Order Number : 19922
Runs on: IBM PC
Price: \$199.95

**PIE:Writer. In micro word processors,
the best any money can buy.**

Available at your local dealer, or call: 1-800-343-1218
(In Mass., call 617-937-0200)

HAYDEN SOFTWARE

Compare the Olivetti M20 with any other personal computer, and you may win a trip to the Italian Grand Prix.



When you compare the Olivetti M20 with any other personal computer on the market, you'll find there's really no comparison. Because the M20 has more computing power at a smaller price than anyone else. That's right, anyone.

And we can prove it. Just take the Olivetti Challenge. When you're finished, simply drop it in the mail. Chances are, you might win one of the many exciting prizes in the Olivetti Challenge Sweepstakes.

Or, drop by and see an Olivetti dealer and pick up an official entry form. There's no purchase necessary. But hurry, the offer ends June 30, 1983.

GRAND PRIZE

An expense-paid week for two at the Italian Grand Prix in Monza, Italy.

FIVE SECOND PRIZES

Puch 12-speed European racing bicycles.

TEN THIRD PRIZES

Seiko Analog/Digital racing watches.

FIFTY FOURTH PRIZES

Handsome racing jackets.

Whose personal computer offers...	Olivetti M20 Personal Computer	Challenger #1_____	Challenger #2_____	Challenger #3_____
Microprocessors: 16 bit Z8001/8086; 16 bit BUS	✓			
Memory: 128K-512K	✓			
Disk Storage: 320K-640K floppy disks; 11MB Winchester	✓			
High Resolution Graphic Display: 512 X 256 monochrome or color	✓			
Operating Systems: PCOS, CP/M80, 86, 8000, MSDOS	✓			
Communications: parallel, serial and IEEE interfaces, TTY, RBTE, 3270, real-time clock	✓			
Application Software: integrated WP with data base and communications, integrated electronic work sheets with graphics, integrated accounting packages and vertical market packages	✓			
Base Price:* under \$3,000	✓			

*Includes 128K, single 320K drive, monochrome graphic display, serial and parallel interfaces, and real-time clock.

NO PURCHASE NECESSARY

For the dealer nearest you, call 1-800-447-4700.
In Alaska and Hawaii, call 1-800-447-0890.

OFFER ENDS JUNE 30, 1983

DOCUTEL Olivetti
CORPORATION

Ohio residents may obtain an official entry form by sending a self-addressed stamped envelope to Olivetti Challenge Free Entry, P.O.
Box 789, Madison Square Station, New York, NY 10159.

The Future Of Computing: Personal With A Capital P

Computers won't take us through the frontier of the future. Computing will. It's not the machines, but the minds behind them that make the difference

by Paul Kellam, Editor, Personal Computing

When the editors of *Time* magazine put a personal computer on their man-of-the-year cover they were certainly headed in the right direction. But they failed to draw the distinction for their readers between human minds and mere machines. As a consequence, they added to the general confusion over the significance of *personal* computing.

Although words on *Time's* inside pages offered some clarification, neither *personal* nor *computing* was joined in a central theme. So it's not surprising that the important distinction between computers in general and personal computing in particular was lost on quite a few *Time* readers.

Time senior writer Frederick Golden was right on when he wrote: "Computers were once regarded as distant, ominous abstractions, like Big Brother. In 1982 they truly became personalized, brought down to scale, so that people could hold, prod and play with them."

And *Time* writer Roger Rosenblatt was right on when he wrote: "Computers save time. Time is money and time is dreams. . . . Our forefathers wanted land. Machines opened the territory, then closed it down. But the land was never our real territory. The dream was our real territory."

Those paragraphs, unfortunately, only hint at the significant point to



Illustration by Gilbert

Personal computing is our vehicle for the frontier of the 1980s.

be made: Personal computing is our vehicle for the frontier of the 1980s, for the frontier of the future. It gives us unparalleled new capacity to dream—to occupy our real territory, and to occupy that territory as individuals.

Time reader response in a later issue reflected a fear of computers in general, a perception of them as heartless machines likely to institutionalize persons, instead of levers for individual human minds that give individuals the ability to personalize institutions.

"The computer is a marvelous machine, but it will never replace man. . . ." one reader wrote. Of course it won't. As a personal tool personal computing enables individuals to realize their full potential.

"I fear computers will start World War III by mistake," wrote another reader. "They now make errors on income tax, bank statements and utility bills. These machines have no conscience."

Of course they have no conscience. Those are institutional machines. Institutions have only a corporate

conscience. Personal computers have no conscience either, in themselves, but as extensions of individual human minds they are tools for extending those minds and tools for extending the conscience of the individual. As personal tools they give individuals the power to cope with institutional might and wrongs.

"The human mind is more creative than any computer," wrote another reader. "Machines can be bought and sold, the human mind cannot."

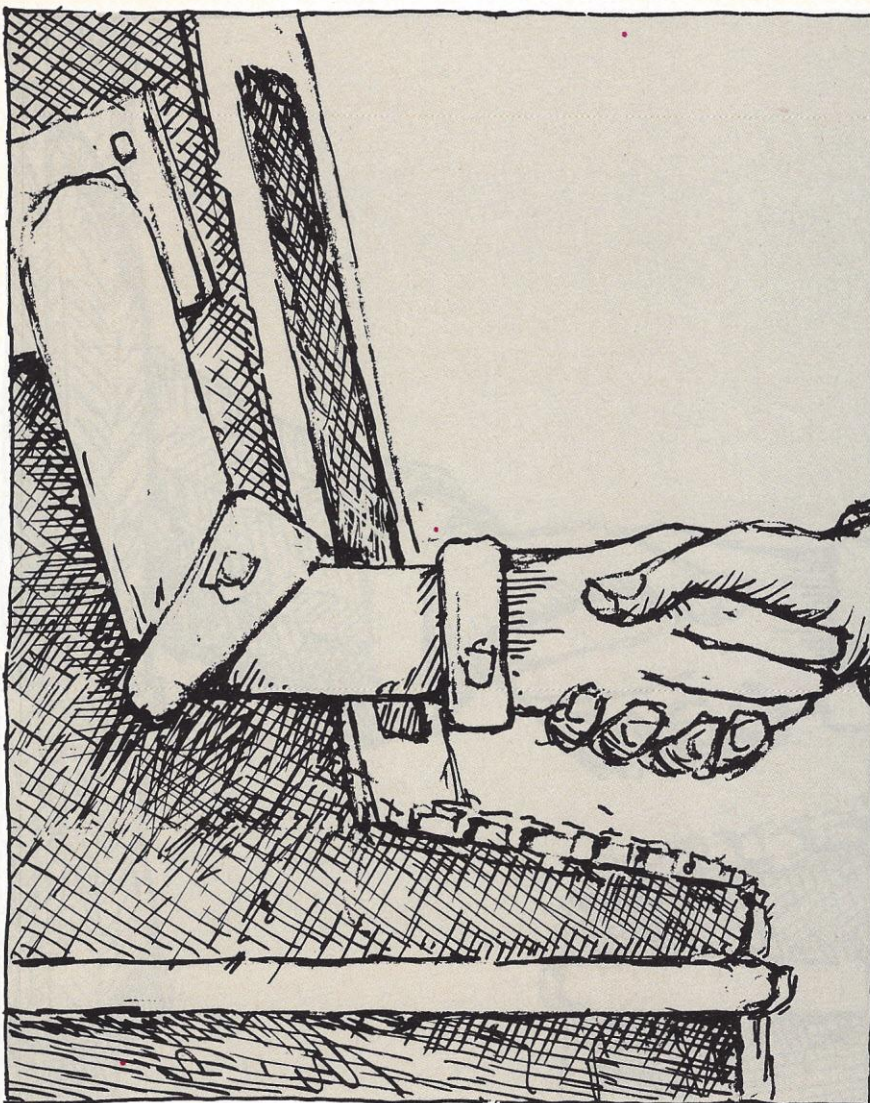
Exactly! That's why the distinction between institutional and personal is so important. Another reader said it, but missed the "personal" point. "Your selection of a computer is a copout," he wrote. "It takes a person to run a computer." Of course; that's the point.

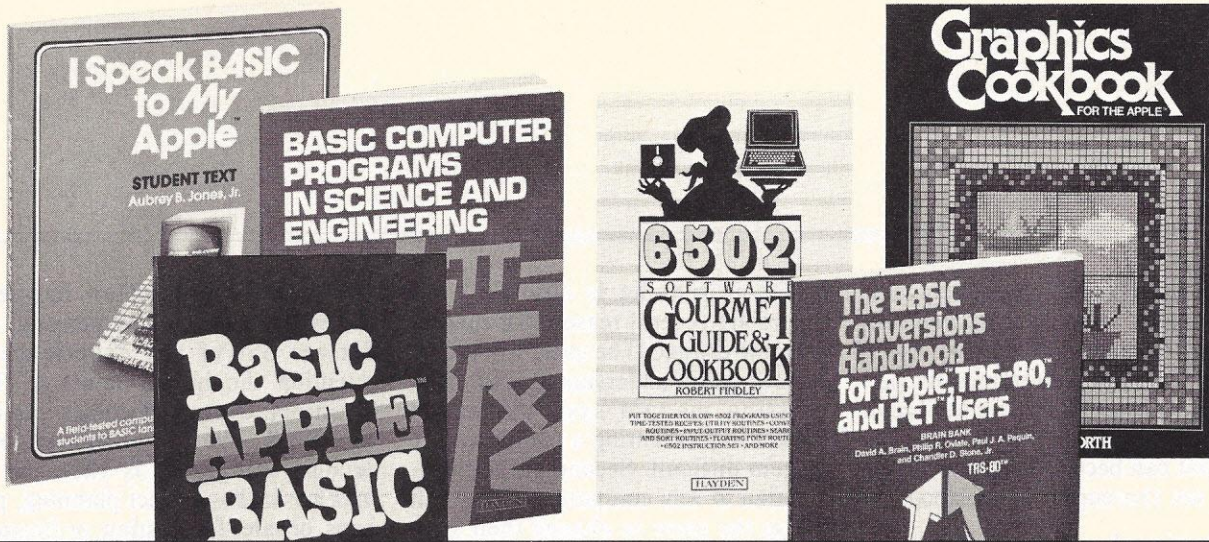
Vital distinctions

Another reader wrote: "*Time* pictured computers in a shopping center, office, farm, classroom and home. However, you failed to show the room where new orders, renewals, payments and cancellations are fouled up." Again, the important distinctions of *personal* and *computing* were missed.

There are computers, and there are computers. As machines they have injected both threat and promise into this age of The Cognitive Revolution in which we live. The crucial distinction between threat and promise lies in an understanding of the meaning of the word "personal." It is not the size of the machine that makes it personal. It is not where the machine is located (home or office) that distinguishes it and makes it personal. It is not even who owns the system that matters.

Rather, it is who has made the decision to use the computer and what it's used for that matters. Personal computing means *you* have made the decision to use a powerful mental tool to enhance *your own* personal productivity, to gain *your own* personal competitive edge.





Apple-aid

I SPEAK BASIC TO MY APPLE™

(Jones) A field-tested computer literacy course that introduces students (and teachers) to BASIC language programming. NO PREVIOUS COMPUTER EXPERIENCE IS REQUIRED. This complete 15-session course is machine specific for the Apple and provides a complete understanding of the machine's operations and functions. The Student Text begins each lesson with learning objectives, followed by definitions of key terms, programming examples, in-class exercises, assignments, a summary, programming practices, and a quiz. Special annotations and suggestions in the Teacher's Manual aid in lesson planning and teaching methods, including answers to all quizzes and practices. Exam set provided on spirit duplicating masters. **Student Text, #6175, \$8.45, Teacher's Manual, #6165, \$17.45, Exam Set, #6185, \$13.75**

Basic Apple™ BASIC

(Coan) A complete guide to Applesoft BASIC. Takes you from beginning concepts, such as entering data and obtaining output, and planning programs, to more advanced topics, such as numeric and string arrays, and sequential and random access files. Alternate techniques for programming in Apple Integer BASIC are also covered, as well as low-resolution and high-resolution graphics. **#5626, \$12.95**

The BASIC Conversions Handbook for Apple™, TRS-80™, and PET™ Users

(The Brain Bank) A complete guide to converting Apple II and PET programs to TRS-80, TRS-80 and PET programs to Apple II, and TRS-80 and Apple II programs to PET. Equivalent commands listed for TRS-80 BASIC (Model I, Level II), Applesoft BASIC, and PET BASIC, as well as variations for the TRS-80 Model III and Apple Integer BASIC. Also describes variations in graphics capabilities, PEEK, POKE, and CALL statements, and much more. **#5534, \$8.95**

Graphics Cookbook for the Apple™

(Wadsworth) Learn how to use your Apple II to "paint" shapes, objects and letters in low-resolution graphics. After explaining the techniques of drawing pictures using Applesoft BASIC the author provides a library of microcomputer graphics. The drawings range from simple geometric shapes to multicolored illustrations of robots, flying saucers, trees, sailboats, and other types of captivating visual artwork. **#6278 \$9.95**

Apple, TRS-80, and PET are trademarks of Apple Computer, Inc.; Radio Shack, a division of Tandy Corp.; and Commodore Business Machines, Inc., respectively, none of which is affiliated with the Hayden Book Company, Inc.

BASIC Computer Programs in Science and Engineering

(Gilder) Save time and money with this collection of 114 ready-to-run BASIC programs for the hobbyist and engineer. There are programs for doing such statistical operations as means, standard deviations, averages, curve-fitting, interpolation, plotting, and histograms. Others let you design antennas, filters, attenuators, and matching networks. All programs are fairly universal so you can run them on your system. **#0761 \$11.95**

6502 Software Gourmet Guide and Cookbook

(Findley) An essential guide to machine language programming for 6502-based microcomputers such as the Apple II, the Atari 400 & 800, and Commodore's PET and VIC machines. The book takes BASIC language programmers into the realm of machine language programming, stressing the advantage and additional programming power available to the user, with 56 basic instructions. **#6277 \$12.95**

Available at your local computer store or



Order by Phone

1-800-631-0856



operator PC53 • In NJ call 201-843-0550, ext. 382

Mail to: Dept. #PC 53 • Hayden Book Company, Inc.
50 Essex Street • Rochelle Park, NJ 07662

Please send me the book(s) indicated below by code number. If I am not completely satisfied I may return the book(s) undamaged within 10 days for a complete refund.

--	--	--

☐ Enclosed is my check or money order.

Please bill my ☐ Visa ☐ MasterCard Expires _____

Name _____

Address _____

City _____

State _____ Zip _____

Visa/MasterCard # _____

Signature _____ B411

We pay postage and handling. Residents of NJ and CA must add sales tax.

This understanding of "personal" is important to us here at *Personal Computing* magazine. It's the use of the system that determines its personalness—not the machine's size or its ownership. And that's a distinction that can become quickly blurred if it's not thoroughly understood.

Institutional vs. personal

Can an institutional machine become personalized? Yes, it can, and often does. Let's say you have a desktop-size computer imposed upon you by the management of the place where you work. You are given this tool to use for a specific task—managing a data base, for example. We would call that an institutional use at the outset, but it's likely to become personalized, and frequently does.

Why? Because the injection of the computer into the equation of getting a task done frequently does far more than merely mechanize or automate that task. The automation is merely the most immediate and obvious productivity gain. At that point the computing is still institutional.

If a mainframe computer is the automating tool the computing is likely to *remain* institutional. But if the automating tool is a personal-size computer in the hands of an individual who is looking for ways to enhance his own personal productivity, then something far more significant than mere automation is likely to occur. The *task itself* is likely to be changed by the computing person.

At that point the system that started out institutional becomes personalized. The individual user of the system has used it to enhance his own personal productivity, to gain his own personal competitive edge.

Inevitable change

Adam B. Green explains the process this way in his book, *dBASE II User's Guide*: "One factor to count on in any computer application is change. A common saying in the computer field is that 'any program

which is running is obsolete.' . . . There are several reasons for this inevitable change. The users will rarely have a good understanding of their existing manual systems, which makes implementing a computerized system difficult. Secondly, the introduction of any computer system will cause the users to change their view of the computer's capability. One common request is, "if it can do that, can't it also do this one little extra function? These little extras can keep a project going forever."

In outline, what goes on is something like this: Manual task is out of hand. Computer is acquired to automate manual task. Automating manual task requires thorough study of it in order to adapt it to computer. Study of task and automation of it reveal inefficiencies, which are improved upon.

Simultaneously, automation of the task reveals capabilities of the computer that were not previously understood. So the task is further streamlined to adapt to the computer capabilities.

And the process goes on. It would not likely go on—at least not to the same extent—in the case of a data-processing department in charge of automating the task. In the case of an individual with imagination and competitive drive, however, the computer becomes a tool for personal efficiency gains.

Can personal computing become institutionalized? Of course. It often does, and that's not all bad.

Let's say you acquire a system for the purpose of automating inventory control in your business, for example. You automate the task and streamline the process to the point where you're satisfied with it. Then you turn the whole thing over to someone else to operate and you go on to other non-computer business concerns.

If everything stops there then that's a personal use turned institutional. The computer is in the same class as a copying machine or a deliv-

ery truck. What often happens, however, is that a new personal use derives out of the experience in pursuing the initial objective. The inventory control becomes institutionalized, but the computer, or a second computer, is then put to *another* task—project planning, perhaps, or sales forecasting, or financial management.

Getting hooked on the potential

This is the magic of *personal* computing. Once people get introduced to *personal* computing they get hooked on it. They don't get hooked on the intricacies of the hardware and software, although that can be fascinating in itself. They do get hooked on the pursuit of what else *personal* computing can do for them. They find out how to save time. Time is money and time is dreams. And the dream is our territory of the future.

It is the reality of a way available now to make personal dreams come true that makes this time in which we live truly revolutionary. The Industrial Revolution is rapidly losing steam. The new revolution—The Cognitive Revolution—is heating up fast.

It has been said that the essentials for civilization are:

- Self-confidence,
- Hopefulness,
- Expectation of one's ability to exert some control over one's destiny,
- Knowledge and the means to acquire it and pursue it . . . and
- Love—i.e., the capacity to be concerned for others, the resources to be able not to be fully occupied with the basics of food, clothing and shelter, the ability to rise above self concern.

It might be said that all of these essentials are embodied in a sense of posterity—the ability to look beyond today, to look even beyond one's lifetime, forward to a vision of and concern about the future.

The Cognitive Revolution is inevitable, we submit, because the power of *personal* computing gives individ-

*Personal computing
will sweep forward quickly
and give us power.*

uals a huge leg up on those ingredients of life that are the essentials of civilization.

There is no question but that personal computing breeds self-confidence as individuals are better able to gather, organize, and analyze facts, and thus gain knowledge. You might call it the ability to get on top of things.


Being on top of things generates hopefulness and expectation of one's ability to exert some control over one's destiny. And that makes room for love.

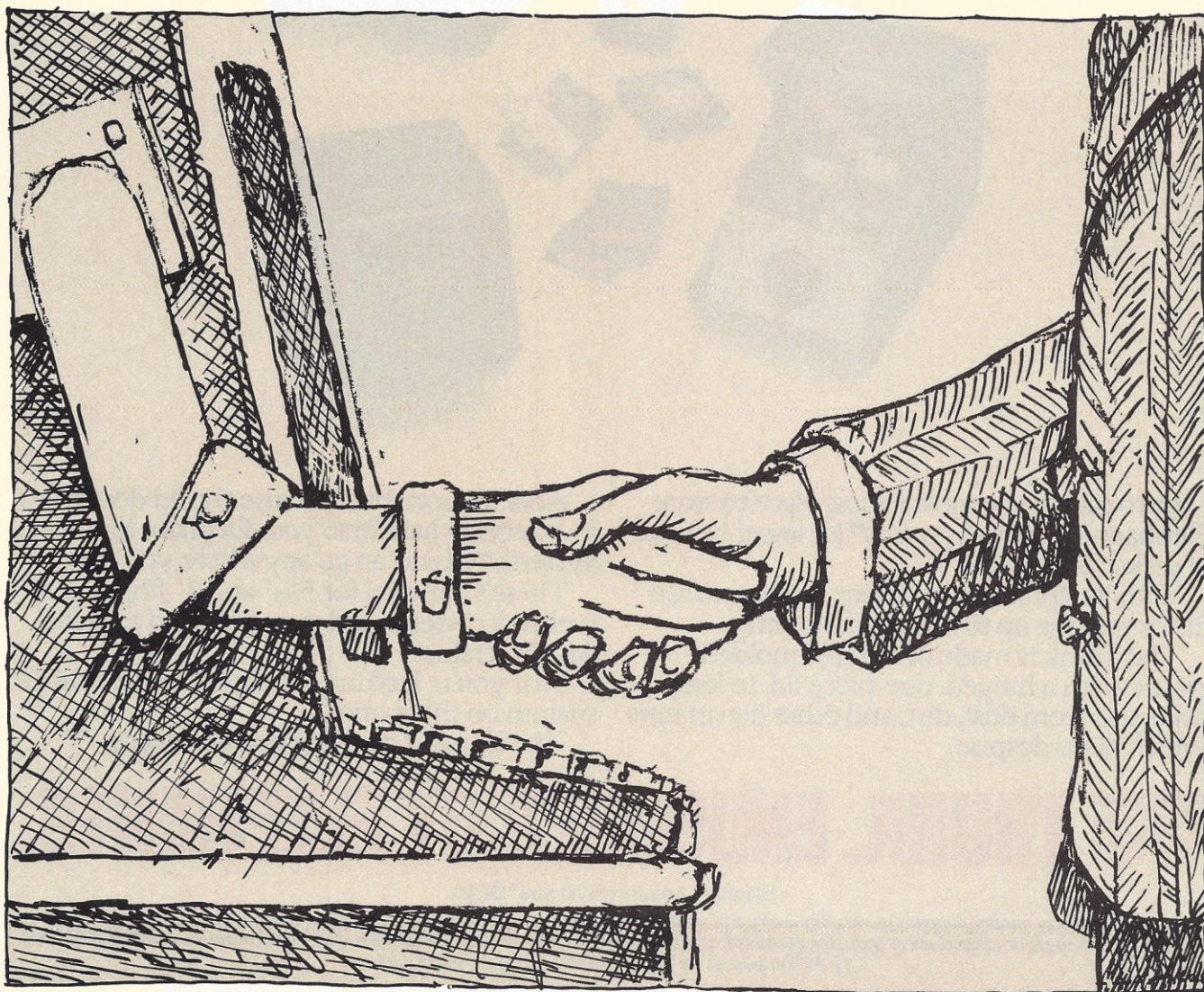
Despite fear of computers—computerphobia—as with most things new, The Cognitive Revolution is inevitable, because our real territory is our dreams and *personal* computing gives us the ability to make our dreams come true.

We have just begun. Personal computing is still in the Model-T-Ford stage of development. Personal computing will sweep forward quickly and give us personal power that we cannot even imagine today.

And perhaps that's the real root of the fear. More than a fear of the

machine is a sense of insecurity as to one's ability to deal with the future. Personal computing will inevitably alter the status quo, as machines did, but in ways that machines never did.

For man's mind is limitless, constrained only by its ability to engage the environment in which it finds itself. As that ability is leveraged by individuals the results personally and internally will be akin to colonization of the planets, if you want to look ahead, or akin to invention of the wheel, if you want to look to the past. 



TRUNKS FOR THE MEMORIES.



Introducing the most logical place to store Elephant Memory Systems® (or lesser brands of disks): The Trunk.

With its alphabetized library index, you can file or retrieve up to 60 disks, instantly.

The Trunk is made of durable molded plastic with a hinged, one-piece lid, to keep disks safe from dust, dirt, and other detriments which disks despise.

And, it's portable. Because the lid doubles as a carrying handle so your Elephant Memory Systems® disks can go anywhere you do.

There's a model for 5¼" and 8" floppies, as well as a cassette-and-game file and a special Atari® version.

So if you're looking for the best disk storage system on the market...

The Trunk is an open-and-shut case.


THE TRUNK. ENDORSED BY ELEPHANTS.

Elephant Memory Systems® Disks

A full line of top-quality floppies, in virtually every 5¼" and 8" model, for compatibility with virtually every computer on the market. Guaranteed to meet or exceed every industry standard, certified 100% error-free and problem-free, and to maintain its quality for at least 12 million passes for over a life-time of heavy-duty use.

Marketed exclusively by Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021.

Call: toll-free 1-800-343-6833; or in Massachusetts call collect (617) 828-8150. Telex 951-624.



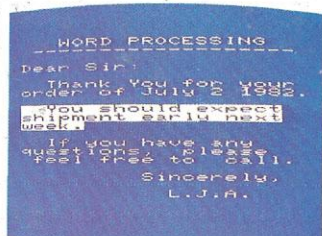
GUARANTEED TOUGH.

**LEADING
EDGE.**

225 Turnpike Street, Canton, Massachusetts 02021
Toll-free: 1-800-343-6833; in Massachusetts (617) 828-8150. Telex 951-624.

CIRCLE 107

IF YOU OWN A COMMODORE COMPUTER, YOU KNOW IT CAN DO ALL THIS.



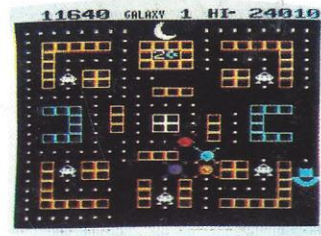
BUSINESS



EDUCATION

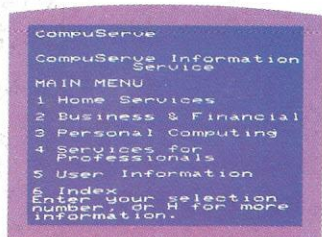


PROGRAMMING

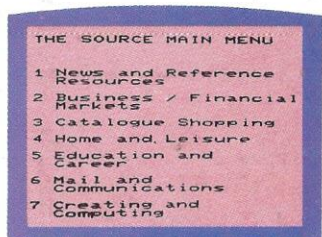


GAMES

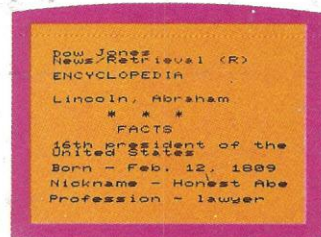
BUT DID YOU KNOW FOR ABOUT \$100, YOU CAN ALSO GET IT TO DO ALL THIS?



COMPU SERVE™



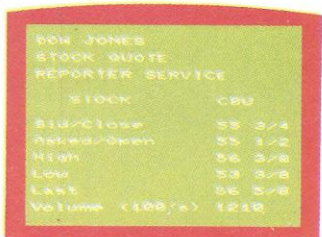
THE SOURCE™



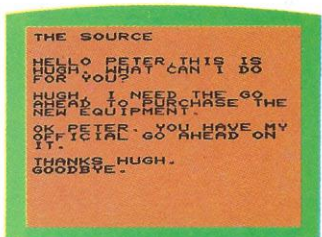
ENCYCLOPEDIA



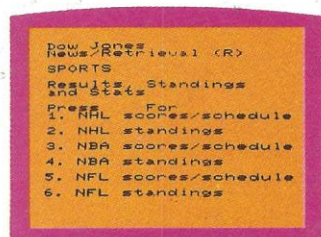
SHOP AT HOME



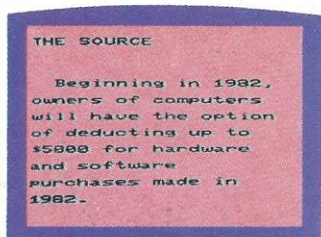
**DOW JONES
NEWS/RETRIEVAL**



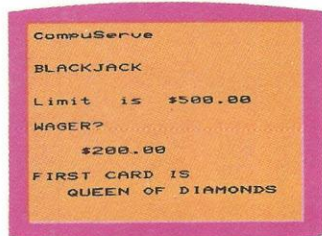
**ELECTRONIC
MAIL**



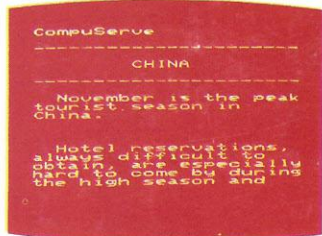
**WIRE SERVICE
NEWS**



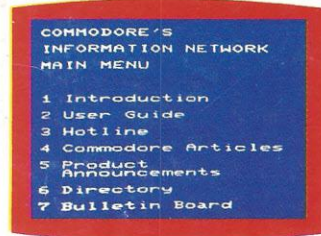
TAX ADVICE



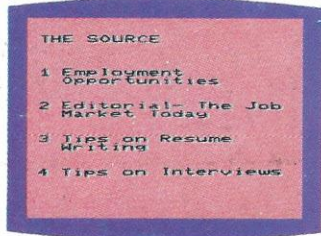
GAMES



**TRAVEL
INFORMATION**



**COMMODORE
INFO. NETWORK**



**EMPLOYMENT
OPPORTUNITIES**



The screens at the top of the page show a few examples of how versatile the VIC 20™ or Commodore 64™ can be with the addition of Commodore software.

The screens below them give you a few examples of how much

more versatile they can be with the addition of a Commodore VICMODEM.

For around \$100, the Commodore VICMODEM will turn your VIC 20 or Commodore 64 computer into a telecomputer.

To make matters even better, Commodore includes a few little extras (such as a free hour's time on the two most popular telecomputing services) that add up to a value of \$197.50*. A nice return on

an investment of about \$100.

Most computer companies think it's reasonable to ask as much as \$500 for a modem that'll give you telecomputing capabilities such as ours.

However, with a VICMODEM priced at around \$100, we think we're being a lot more reasonable. Don't you agree?

commodore
COMPUTER

U.S.A. - PO Box 500, Conshohocken, PA 19428; Canada - 3370 Pharmacy Avenue, Agincourt, Ontario, Canada M1W 2K4. * Certain offers subject to change: CompuServe is a trademark of CompuServe, Inc. and H.R. Block Co. Dow Jones News/Retrieval Service is a registered trademark of Dow Jones & Co., Inc. The Source is a service mark of Source Telecomputing Corporation, a subsidiary of Reader's Digest Corporation, Inc.